CRITERIA 3

RESEARCH, INNOVATIONS AND EXTENSION

3.3.1 Number of research papers published per teacher in the Journals notified on UGC website

3.3.1 Number of research papers published per teacher in the Journals notified on UGC website during the last five years

2021-22

SL No	Title of Paper	Name of Author
1	Atma Nirbhar Abhiyaan in context of global Marketing	Mr. Govind S Menon
2	Fabrication of a Flat Plate Photovoltaic Thermal Collector	Mr. Govind S Menon
3	The Impact of Covid-19 on Construction and Engineering Sectors in India and Elsewhere	Mr. Govind S Menon
4	"Do regulatory mechanisms affect corporate social performance? Evidence from emerging economies",	Dr Clement Cabral
5	A Study on the Influence of Relationship Marketing on Customer Concerning Ernakulam	Ms Sreeja Kumar,Mr Arun Kumar,Dr.K.Latha
6	Work Life Balance During Work From Home For Indian Working Women During Covid -19	Deepa Pillai and Rajeshwari
7	The Impact of Consumer behaviour on Green Marketing Practices:An Exploratory approach	Ms.Sreeja Kumar,Ms. K.Latha ,Mr.Arun Kumar
8	An Analysis of Data Science and its Applications	Mr. Mariadas Ronnie C.P
9	Daily Covid cases and selected stock market indices: An attempt to understand the movements of the NIFTY 50 index during the pandemic	Ms. Rinu Jayaprakash
10	The Impact of Covid-19 on Construction and Engineering Sectors in India and Elsewhere	Mr. Govind S Menon
11	CREDIT RISK ASSESSMENT WITH FEATURE SELECTION TECHNIQUES, .	Ms. Jismy Joseph
12	A survey on Cloud Computing Security Using different Cryptographic Algorithms	Sudha D
13	Experimental investigations on unglazed photovoltaic-thermal (PVT) system using water and nanofluid cooling medium	Govind S Menon
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15	Growth through Repositioning - The Case of IHCL,	Dr. Shobha Menon
16	Identifying the potential role of curcumin analogues as anti-breast cancer agents; an in silico approach	Divya UK
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21	Influence of Sogo or Music Logo in Brand Identification	Balagopal P.K
22	Enhancement of Social Training and Social Interaction among the Tribes	Dr Anthony Kuttencherry
23	Sustainability in Relation to Green Governance Environment in India	Dr. K.Latha
24	Trauma Retold by the Characters of Margaret Atwood	Veni Mariadas

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ATMA-NIRBHAR BHARAT ABHIYAAN' IN THE CONTEXT OF GLOBAL MARKETING

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Abstract: **:** On 12 May, 2020, the Honourable Prime Minister of India, Shri Narendra Modi announced in his address to the nation an economic package of Rs. 20 trillion to tide over the Coronavirus crisis under the Atma-Nirbhar Bharat Abhiyaan. Complementing this view point of the nation, the Honourable Finance Minister of Govt. of India Smt. Nirmala Sitaraman in her budget presentation speech announced Rs. 35,000 crore for the development of Covid-19 vaccines. Even though one can find out certain controversies around the Atma-Nirbhar Bharat Mission, the current scenario warrants for more thought-provoking intrusions into the subject. The present paper details the intricacies of the Atma-Nirbhar Bharat Abhiyan and relates it to the global marketing scenario.

Index Terms - Abhiyaan,MSME,PPP

I. INTRODUCTION

The headlines of a very recent newspaper in early July 2020 report goes like this: "Atma-Nirbhar Bharat Abhiyaan: Not about closing doors, but greater global engagement, says Piyush Goyal". The report continues, "Borrowing from Prime Minister Narendra Modi's five 'Is' — intent, inclusion, investment, infrastructure and innovation – Piyus Goyal, Union Minister for Commerce & Industry and Railways, Government of India said India should focus on investment, infrastructure and innovation in the post-Covid world". According to him most countries across the world have succeeded on the back of new technology, engagement with newer ways of doing work and innovating not only in products and services but also their processes. 'Atma-Nirbhar Bharat Abhiyaan' was not about closing India's doors but opening them and having a greater global engagement. Emphasising that self-reliance does not entail cutting ties with rest of the world, it actually meant a larger role for Indian entrepreneurs, businesses, youngsters and all stakeholders to become a part of resilient global supply chains. "It is about improving our quality of production, achieving higher economies of scale, greater production capacities so that we not only meet India's needs but also meet global demand at competitive prices and through quality products," the Minister said addressing the officials of Bombay Chamber of Commerce and Industry (BCCI) at its 184th Annual General Meeting".

Newspapers of 9 January, 2021 also carry the following headlines: "Atma-Nirbhar Bharat Abhiyaan will make world order more just and fair: Kovind". The report continues: "Ram Nath Kovind, Honourable President of India, said the development of two vaccines for Covid-19 in India is a major step for Aatma-Nirbhar Bharat (Self-reliant India) which runs on the spirit of global well-being. The recent success of our scientists and technicians in developing two Covid vaccines is a major achievement for the Aatma-Nirbhar Bharat Abhiyaan which is driven by the spirit of global well-being," the President said, delivering the Valedictory Keynote address of Pravasi Bhartiya Divas Convention, 2021. The Drugs Controller General of India (DCGI) has approved two vaccines, 'Covishield' from Oxford and Serum Institute of India (SII) and 'Covaxin', an indigenous vaccine developed by Bharat Biotech. He said that year 2020 has been the year of a global crisis caused by Covid-19 and India has been at the forefront in forging a global response to combat the enormous challenges posed by the pandemic. We supplied medicines to nearly 150 countries, making the world look at India as the 'pharmacy of the world'," he added. He said that the Indian government intends to mitigate any disruptions in global supply chains by enhancing availability of goods and services. The idea of Aatma-Nirbhar Bharat is about self-belief leading to self-sufficiency but not seeking self-centered arrangements or turning the country inwards. "Our vision of Aatma-Nirbhar Bharat Abhiyaan has five key pillars of economy, infrastructure, demography, democracy and supply chains".

Obviously these two reports achieve significance in the context of opinion expressed by Shri Amitabh Kant, IAS, CEO, NITI Aayog, Govt. of India. Shri Kant opined that Innovation is the key to success for economic growth and Atma-Nirbhar Bharat Abhiyaan is not anti-globalisation. Sharing his thoughts at FICCI Frames he said that India is in the midst of transformation and people who work with the technology and sunrise sectors will survive going ahead. The country needs to leapfrog into the world of technology. India very often gets into sunset areas of industries and then it becomes very difficult to penetrate in the global market. Therefore, it is very important for the country to get into new areas of growth. He highlighted that people who are going to work on data and artificial intelligence will drive growth going ahead. India's usage of data will be enormous. There is a need to move from data to data intelligent, according to him. The use of block chain is the need of the hour. The technology will also help in real-time monitoring of specific issues. India needs to liberalise on clinical trials and there is a need to get into high-value products. Atma-Nirbhar Bharat Abhiyaan programme has brought many reforms in the form of MSME definition, agricultural sector, among others. Atma-Nirbhar Bharat is not anti-globalisation. It is about getting the best from the world. It is not about protectionism. It is about enhancing the ability of Indian companies to create world-class products and capture the domestic market and then use the strength of the domestic market to penetrate into the global market. It is about being a global champion.

Complementing this view point of the nation, the Honourable Finance Minister of Govt. of India Smt. Nirmala Sitaraman in her budget presentation speech announced Rs. 35,000 crore for the development of Covid-19 vaccines. This is the most important pillar of the vision for Atma-Nirbhar and Swachh Bharat and while the economy is still struggling with the consequences of Covid-19, budgetary support for vaccination and healthcare assumes utmost importance. The government will be focussing on three areas *viz.* preventive health, curative health and well-being. The financial support will overcome fears and boost the service sector for full recovery. As vaccination progresses, hospitality, tourism and formal retail sectors will resume their normal pace.

In the budget speech, the Finance Minister said that the National Infrastructure Pipeline (NIP) launched in December, 2019 with 6,835 projects, has now been expanded to 7,400 projects and around 217 projects worth Rs. 1.10 lakh crore under some key infrastructure ministries have been completed. The budget proposes significant enhancement of capital expenditure to the tune of Rs. 5.54 lakh crore in the next fiscal, besides creating institutional structures and giving a big thrust to monetizing assets to achieve the goals of NIP. NIP is a specific target which the government is committed to achieving over the coming years, which requires a major increase in funding both from the government and the financial sector.

Atma-Nirbhar Bharat Mission

Atma-Nirbhar means 'Self-reliant'. On 12 May, 2020, the Honourable Prime Minister of India, Shri Narendra Modi announced in his address to the nation an economic package of Rs. 20 trillion to tide over the Coronavirus crisis under the Atma-Nirbhar Bharat Abhiyaan. He said the economic package would play an important role in making India 'self-reliant' and that it would benefit labourers, farmers, honest tax payers, MSMEs and the cottage industry. Making the country self-reliant is the only way to make 21st century belong to India. According to the government, it is not protectionist in nature. The economic crisis triggered by the Coronavirus pandemic in 2020 gave birth to the Atma-Nirbhar Bharat Abhiyaan. While the idea was first proposed by the Prime Minister, some of its features are similar to the Swadeshi Movement launched on 7 August, 1905, to take on the British regime of the time.

The five pillars on which Atma-Nirbhar Bharat is to be based are: 1). Economy, 2). Infrastructure, 3). Technology driven system, 4). Vibrant demography, and 5). Demand. According to the government, self-reliance does not advocate a self-centered protectionist system. According to the Honourable Prime Minister of India, Shri Narendra Modi, Atma-Nirbhar Bharat spirit pervades every day from cricket to Covid fight. "It is not only about technological advancement and progress. It has become part of everyday life of the nation," he said, addressing the 18th Convocation of Tezpur University digitally from New Delhi on 21 January, 2021. In this context, he referred to the miraculous victory of the young Indian cricket team in Australia which overcame multiple challenges to win the Test match series. "They faced the challenges boldly and came up with new solutions despite a string of injuries and lack of experience. A positive mind-set always leads to positive results which is the essence of Atma-Nirbhar Bharat".

Summary of announcements under Atma-Nirbhar Bharat Abhiyaan

On 12 May, 2020, the Prime Minister of India, Shri Narendra Modi, announced a special economic package of Rs. 20 lakh crore (equivalent to 10% of India's GDP) with the aim of making the country independent against the tough competition in the global supply chain and to help in empowering the poor, labourers, and migrants who have been adversely affected by Covid-19. Following this announcement, the Finance Minister, Smt. Nirmala Sitharaman, through five press conferences, announced the detailed measures under the economic package. Following is a summary of the key measures proposed under the economic package:

Government Reforms: Policy Highlights

- Increase in borrowing limits
- Privatisation of Public Sector Enterprise (PSEs)

Measures for businesses (including MSMEs)

Financial Highlights

- Collateral free loans for businesses
- Corpus for MSMEs
- Subordinate debt for MSMEs
- Schemes for NBFCs
- Employee Provident Fund (EPF)
- Statutory PF contribution
- Street vendors

Policy Highlights

- Expediting payment of dues to MSMEs
- Insolvency resolution
- Disallowing global tenders
- Reduction in TDS and TCS rates
- Ease of doing business for corporates

Legislative Highlights

- Definition of MSME
- Initiation of insolvency proceedings
- Amendments to Companies Act, 2013

Agriculture and Allied sectors

Financial Highlights

- Concessional Credit Boost to farmers
- Agri Infrastructure Fund
- Emergency working capital for farmers
- Support to fishermen
- Animal Husbandry infrastructure development
- Employment push using CAMPA (Compensatory Afforestation Management and Planning Authority) funds

Legislative Highlights

- Amendments to the Essential Commodities Act
- Agriculture marketing reforms
- Agriculture Produce Pricing and Quality Assurance

Migrant Workers: Policy Highlights

- One Nation One Card
- Free food grain supply to migrants
- Affordable Rental Housing Complexes (ARHC) for migrant workers / urban poor

Civil Aviation: Policy Highlights

- Efficient airspace management
- Public Private Partnership (PPP) model for airports

Defence: Policy Highlights

- Increase in FDI limit in defence manufacturing under automatic route
- Make in India initiative in the defence sector

Energy: Financial Highlights

- Liquidity support for distribution companies (Discoms)
- Coal evacuation

Policy Highlights

- Safeguarding consumer rights
- Regulatory assets
- Privatisation of power distribution
- Commercial coal mining

Legislative Highlights

- Reduction in cross-subsidy

Housing: Financial Highlights

- Credit Linked Subsidy Scheme for Middle Income Group (MIG)

Policy Highlights

- Support to real estate sector

Social Sector: Policy Highlights

- Public health
- Allocation for MGNREGS
- Viability Gap Funding
- Technology driven education

Key measures taken by Reserve Bank of India (RBI)

The overall financial package that has been announced also includes the liquidity generated by measures announced by RBI. Some of these measures include:

- Cash Reserve Ratio (CRR) was reduced which resulted in liquidity support of Rs. 1,37,000 crore.
- Banks' limits for borrowing under the marginal standing facility (MSF) were increased. This allowed banks to avail additional Rs. 1,37,000 crore of liquidity at reduced MSF rate.
- Total Rs. 1,50,050 crore of Targeted Long Term Repo Operations (TLTRO) has been planned for investment in investment grade bonds, commercial paper, non-convertible debentures including those of NBFCs and MFIs.
- Special Liquidity Facility (SLF) of Rs. 50,000 crore was announced for mutual funds to provide liquidity support.
- Special refinance facilities worth Rs. 50,000 crore were announced for NABARD, SIDBI and NHB at policy repo rate.
- A moratorium of three months has been provided on payment of instalments and interest on working capital facilities for all types of loans.

Controversy around Atma-Nirbhar Bharat Mission

The government has said 'self-reliant India does not mean cutting off from rest of the world.' However, some have called Atma-Nirbhar Bharat as a re-packaged version of the Make in India drive using new taglines such as 'Vocal for Local'. Some are of the opinion that Atma-Nirbhar Bharat is not even new – it resonates well with erstwhile ideologies and campaigns (political, business, social or otherwise) such as 'Swaraj', 'Swadeshi', 'The Green Revolution', 'The White Revolution', 'Import Substitution', and also innumerable campaigns of Indian organizations such as Patanjali. Some Opposition members have spoken about how India had enacted policies and built companies since its creation to make India self-reliant - SAIL for steel production, IITs for domestic engineers, AIIMS for medical sciences, DRDO for defence research, HAL for aviation, ISRO for space, CCL, NTPC and GAIL in the area of energy, for example. These politicians have criticised the so-called advertising tactics in the re-packaged scheme. Some have also panned the scheme re-phrased as "Fend For Yourself" Campaign.

Time to think about global marketing and Atma-Nirbhar Bharat

Global marketing can be defined as marketing on a world-wide scale reconciling or taking global operational differences, similarities and opportunities in order to reach global objectives". Global marketing is also a field of study in general business management that markets products, solutions and services to customers locally, nationally, and internationally. International marketing is the application of marketing principles in more than one country, by companies overseas or across national borders. It is done through the export of a company's product into another location or entry through a joint venture with another firm within the country, or foreign direct investment into the country. International marketing is required for the development of the marketing mix for the country. International marketing includes the use of existing marketing strategies, mix and tools for export, relationship strategies such as localization, local product offerings, pricing, production and distribution with customized promotions, offers, website, social media and leadership. Internationalization and international marketing is when the value of the company is exported and there is inter-firm and firm learning, optimization, and efficiency in economies of scale and scope. International marketing is the performance of business activities that direct the flow of goods and services to consumers and users in more than one nation. It is the application of marketing principles to satisfy the varied needs and wants of different peoples residing across the national borders. It is also the application of marketing principles by industries in one or more than one country. The international promotion policy is another key factor in the global market. Besides deciding a global or local promotion, the type of promotion that we should carry out will be related to the distribution systems available in the foreign markets. International branding is a process of designing a distinct name and picture for an item in the minds of the customers, mainly through advertising campaigns.

Global marketing relies on firms that understands the requirements associated with servicing customers locally with global standard solutions or products and localizes that product as to maintain an optimal balance of cost, efficiency, customization and localization in a control-customization continuum to meet local, national and global requirements. Global marketing and global branding are integrated. Branding is a structured process of analyzing "soft" assets and "hard" assets of a firm's resources. The strategic analysis and development of a brand includes customer analysis (trends, motivation, unmet needs, segmentation), competitive analysis (brand image/brand identity strengths, strategies, vulnerabilities), and self-analysis (existing brand image, brand heritage, strengths/capabilities, organizational values). Global brand identity development is the process of establishing brands of products, the firm, and services locally and world-wide with consideration for scope, product attributes, quality, uses, users and country of origin; organizational attributes; personality attributes, and brand-customer relationship; and important symbols, trademarks metaphors, imagery, mood, photography and the company's brand heritage. A global marketing and branding implementation system distributes marketing assets, affiliate programs and materials, internal communications, newsletters, investor materials, event promotions and trade shows to deliver integrated, comprehensive and focused communication, access and value to the customers.

Now let us come to the point. What does this renewed interest in 'Atmanirbharta' (self-reliance) mean for marketers and campaign managers working for/with home-grown organisations? First and foremost, marketers and campaign managers need to accept the resurgence of nationalist fervour propelled by the Covid-19 crisis, especially its place of origin. The changes introduced in the economy and functioning of businesses are here to stay and so is the renewed interest in all things home-grown. Marketers and campaign managers need to quickly adapt to the new normal. Second, as social distancing measures will now be the norm, marketers and campaign managers need to be more self-reliant in designing and executing marketing campaigns. Physically meeting and discussing your campaign plans with your research and advertisement agencies and overseeing the executions of the campaigns will not be a regular affair. Hence, developing and executing such campaigns will require the marketer to do a lot of background work before engaging agencies to run the campaigns. Third, marketers who still haven't had the chance to join the digital marketing bandwagon now is the right time. In fact, this is the last chance for them. Fourth, marketers and campaign managers need to have more local content to recapture the imagination of the Indian public. To develop more locally-grounded content, marketers and campaign managers need to work with Indian aesthetics (in place of western concepts and constructs), culture, and traditions. In other words, now is the time to look inwards into our 'atman' (soul) i.e., into our glorious history, culture,and traditions.

II. Acknowledgment

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Fabrication of a Flat Plate Photovoltaic Thermal Collector

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Abstract- A PV/T system is a hybrid system with a solar photovoltaic panel anda solar thermal collector that generate electrical and thermal energy simultaneously. The paper describes the fabrication of an Unglazed Flat Plate Collector system and experimentation of a Photo Voltaic/Thermal (PV/T) hybrid system.The photovoltaic/thermal (PVT) concept offers an opportunity to increase the overall efficiency of a PV module through the use of the waste heat generated in the PV module and subsequently cools the PV module.

Keywords – PV/T, Solar, Absorber, PUF

I. INTRODUCTION

The photovoltaic-thermal hybrid solar collector (or PV/T) is an equipment that integrates a photovoltaic (PV) module, for the conversion of solar energy into electrical energy, and a module with high thermal conversion efficiency, which employs a thermal fluid [1]. Most of the incoming solar energy is either reflected or absorbed as heat energy. Consequently, the working temperature of the solar cells increases considerably after prolonged operations and thereafter the cell's efficiency drops significantly. Unglazed collectors increases the electrical efficiency of the solar panel since the glazing is absent and thus reducing convective heat losses [2].Flat plate collectors are easy to manufacture and require low maintenance [3]. Flat plate collectors collect heat from both types of radiation-beam and diffuse.PV/T system is a type of co-generation system that produces power and heat from a single system by absorbing the waste heat from a solar panel [4].

When properly designed, PV/T systems can extract heat from PV modules, heating water or air to reduce the operating temperature of the PV modules and keep the electrical efficiency at a sufficient level [5]. A very recent example in this regard is studied where the performance assessment and comparison of two cascaded solar-assisted process heating systems have been presented,photovoltaic thermal (PVT) cascaded with flat-plate collector (PVT-FPC) and PVT coupled with heat pipe evacuated tube collector [6]. Solar thermal systems and solar PV systems have each advanced markedly, and combining the two technologies provides the opportunity for increased efficiency and expanded utilization of solar energy [7]. The current paper explains the fabrication of a flat plate photovoltaic thermal collector.

II. DESIGN AND FABRICATION OF THE SYSTEM

The fabrication of the system combines two technologies; a solar photo voltaic panel and a solar thermal collector that generate electrical and thermal energy simultaneously. The thermal collector made of rectangular copper pipes is configured as a Parallel-tube Flat-plate collector and is mounted to the reverse of a Poly crystalline PV panel. The collector pipes of rectangular shape helps in increasing the contact area between the pipes and PV panel, thus increasing the heat transfer. Each collector pipe is covered by insulation tape to reduce heat lose (Fig. 1). The PV/T collector, typically consists of a PV module on the back of which an absorber plate (a heat extraction device) is attached. PV modules convert solar radiation into electricity with peak efficiencies in the range of 5–20% [8]. The purpose of the absorber plate is two-fold. Firstly, to cool the PV module and thus to improve its electrical performance and secondly to collect the thermal energy produced, which would have otherwise been lost as heat to the environment. This collected

heat could be used, for low temperature applications such as domestic hot water production for showers and washing. Normally the electrical and the thermal performance of PV/T collectors is lower than that of separate PV panels and conventional thermal alone [9]. The photo voltaic thermal system consist of the combined flat plate collector and solar panel connected *via.* mechanical bonding. The specifications of the entire system is given in Table 1.

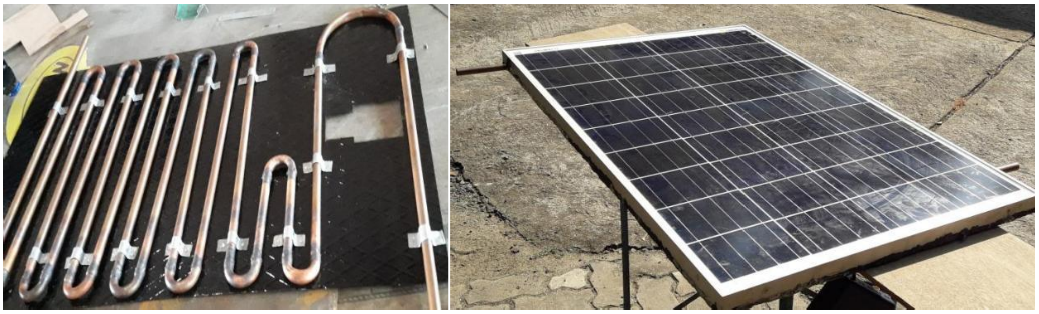


Figure 1. Collector pipes and solar panel

Table - 1 FPC-Flat Plate Collector specifications

Details	**Dimensions**
Length of absorber plate	103 cm
Width of absorber plate	63 cm
Thermal conductivity of plate material	210 W/mK
Absorber plate thickness	2 mm
Insulation material	Glass wool
Heating pipes specifications	0.625 cm dia., 6m length
Length of individual pipes	52.5 cm
Spacing between pipes	4 cm
Thickness of pipes	2 mm
U bend	0.625 cm dia.
Copper pipes loops	7 nos.
Total number of pipes	15
Insulation	PU Foam insulation
Adhesive	Epoxy aluminium paste
Thickness of adhesive	2 mm
Casing material	Aluminium
Dimensions of the casing	107 cm ×67 cm

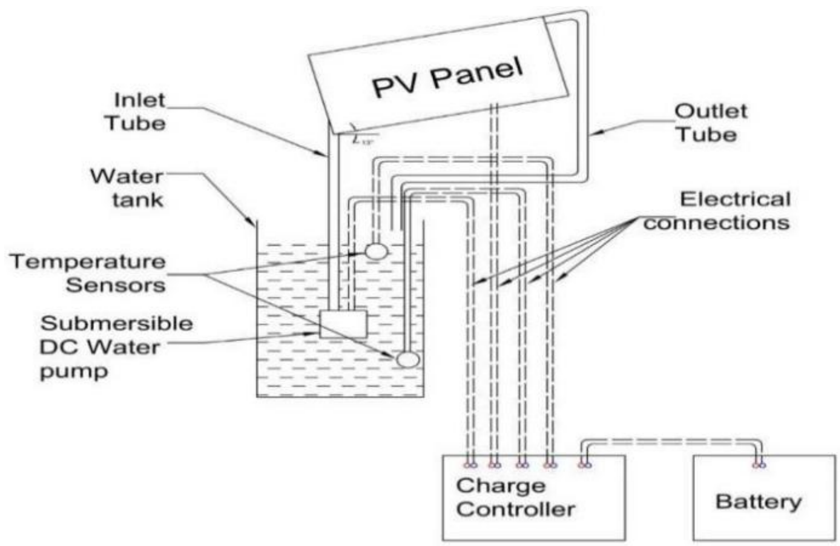
2.1 *Fabrication procedure-*

The aluminium sheet is cut based on the solar panel surface area and based on the positions where electrical connections are to be given. Both sides of the aluminium sheet are painted with black paint to increase absorptivity. Copper pipes are sized based on the length of the absorber plate and brazed with a U bend. They are then riveted to the aluminium sheet**.** The photo voltaic panel is connected to the absorber plate with the help of integration methods.

2.2 *Integration methods-*

Thermally conductive adhesives are the most widely used method in integration of PVlayer with the thermal absorber for all kinds of PV/T modules. Thermal characteristics include high thermal conductivity, extreme operating temperature range and good elongation properties, which improves the overall efficiency of the PV/T module greatly. This thermal adhesive integration method is a simple and cost effective one. In the present studies aluminium epoxy paste is used as adhesive. Epoxy adhesive is applied to fix the aluminium

sheet to the reverse side of the solar panel. Adhesive 'M-seal' is applied to the joints to prevent leakage of water. The entire system is closed and sealed with aluminium sheet (made in the form of an external casing). The PUF insulation is poured through the holes drilled in the casing and solid insulation is formed between the pipes.



2.3 *PV/T system and accessories-*

The systems comprises of storage tanks and temperature sensors, flexible hose (Figure 2). The water is stored in a tank connected to a DC pump in order to circulate the water. The temperature sensors are used to measure the temperature of the PV Panel, outlet hot water temperature and inlet cold water temperature.

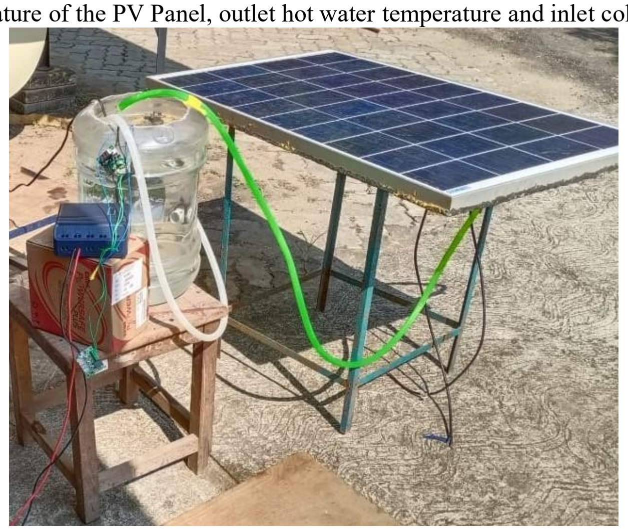


Figure 2. Fabricated PV/T system

2.4 *Specifications of the system-*

Solar Panel - Luminous Polycrystalline, Maximum power = 100 W, Open circuit voltage 22V, Short circuit current 6.06 A, Battery Luminous 110 Ah, Charge controller 6 A, 12 V.

2.5 *Material Selection Parameters-*

Absorber plate: Aluminium (High thermal conductivity, Light weight), Heating pipes: Copper pipes (Good heat transfer), Pipe bends (U bends), Black paint (To increase solar absorptivity), Insulation - PUF foam (High insulation capacity, good thickness, less air leakage), Casing - Aluminium (Less corrosive property).

III. EXPERIMENT AND RESULT

Photovoltaic technology is one of the finest ways to harness the solar power [10]. Photo voltaic thermal systems are co-generation systems that extract waste heat from the PV system. A PV/T system is a hybrid system with a solar photovoltaic panel and a solar thermal collector that generate electrical and thermal energy simultaneously. A review of literature suggests that most of the earlier research goals were twofold, that is to enhance the efficiency of the solar PV systems and to ensure a longer life at the same time [11]. Initially the PV system is tested for many days and it was found from the experimental values that as the open circuit voltage reduces at noon time and short circuit current increases at noon time since the temperature reduces and consequently the efficiency of the system reduces. In the present studies the fabrication of an unglazed Flat Plate Collector system was done for further experimentation of a Photo Voltaic/Thermal (PV/T) hybrid system. The future applications of photo voltaic technology will utilize the system technology available today and sub-system technology advances can be accommodated through minorsystem changes [12].

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The Impact of Covid-19 on Construction and Engineering Sectors in India and Elsewhere

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Abstract: The Covid-19 pandemic has devastated the world of work. Its impact, which varies across sectors, has been significant in the construction sector also. The construction and the engineering sectors were the ones that had to bear the worst brunt of Covid-19, as it was already battling a liquidity crunch as fallout of the non-banking financial institutions in the financial sector since the beginning of 2020. This article analyses the Covid-19 pandemic situation and its effect on construction and engineering sectors in Indian and elsewhere. it is essential to have a thorough rebuilding plan after an analysis of all the risks by each player in their respective universes and a proper execution of the Concrete measures for reviving the construction sector includes ensuring safety of informal labourers, increased remuneration to skilled work force, reduction of interest rates.

Keywords — Construction, Corona virus, Covid-19, Engineering, Financial sector, Liquidity crunch

I. INTRODUCTION

The world today stands under the recovery phase from the severe attack of the Coronavirus or the Covid-19 pandemic. Almost every commercial activity is suffering at the hands of the ruthless Covid-19. The hardest affected sector, the construction and engineering sector is definitely on the wrong end of the curve. (Kohli and Chadha (2020). The COVID-19 pandemic has devastated the world of work. An article by Sigahi *et al.* (2021) presents a systematic review to investigate the impact of Covid-19 on work and workers of all occupations, which reveal research gaps, and help managers to adapt to organizations amid the pandemic. Its impact, which varies across sectors, has been significant in the construction sector (ILO, 2021). The construction and the engineering sectors were the ones that had to bear the worst brunt of Covid-19, as it was already battling a liquidity crunch as fallout of the non-banking financial institutions in thefinancial sector since the beginning of 2020. According to a new study tracking the results of more than 730,000 COVID-19 tests, it was found that construction workers had the highest positivity rates for asymptomatic cases of any occupation, including healthcare staff, first responders, correctional personnel, elderly care workers, grocery store workers and food service employees (Joe Bousquin, 2020).

This sector, which was already reeling with multiple challenges from lack of capital and credit avenues to insolvencies, multiple frauds and regulatory burden under the Environment Laws and the Real Estate (Regulation and Development) Act, 2016, is now marred by the Covid 19 pandemic, with no likely relief in sight. A very recent study by the KPMG Group describes in detail how the Covid-19 pandemic is affecting the construction sector (Anon., 2020a).The construction sector represents a key component of countries' economies—it is approximately 13% of global GDP—as such, having the availability to perform construction activities with a minimum spread of COVID-19 may help to the financial response to the pandemic (Felipe Araya, 2021). A literature review of studies on the COVID-19 pandemic in supply chain disciplines by Priyabrata Chowdhury *et al.* (2021) also endorses this situation. Contractors are struggling to find enough skilled craft workers even as they continue to be impacted by pandemic-induced project delays and supply chain disruptions, according to a workforce survey from the Associated General Contractors of America and Autodesk (Anon., 2021). The survey results show how the COVID-19 pandemic has created constraints on the demand for work even as it limits the number of workers that contractors can hire.

Many projects remained in the unfinished stages because of the lack of funds. Those that were finished remained unsold, because of changing buyer preferences. At a time when the stakeholders in the construction industry i.e. developers and contractors were treating this period of change as a learning curve, reassessing needs and working out strategic deals, the pandemic brought all construction activity to a grinding halt. To contain the pandemic, like many nations, Government of India has also imposed a lockdown, in many of its states, restricting the movement of people and gatherings. In the construction sector, hordes of workmen toil together to meet the timelines. However, due to the restrictions put in place by the Government, all the construction activity and most of the business activity across the country has halted.

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Beyond the short-term impact of an economic downturn on construction demand, the crisis is also expected to hit long-term supply and demand, resulting in lasting shifts in investment patterns. Although a high level of economic uncertainty persists, research from the McKinsey Global Institute suggests that economic activity could be back on track by early 2021—if the virus is contained within the next few months and the right economic policies are enacted. However, longer-term lockdowns or other severe restrictions, even intermittent ones, could result in a severe and sustained economic downturn, with economic activity returning to 2019 levels by 2023 at the earliest (Anon., 2020b).

There are multiple consequences of the lockdown, which would further stretch the troubles for the sector like reverse migration, disruption of supply chains, amongst others. Cumulatively, the above circumstances would cause hindrance in meeting the obligations under the construction and engineering contracts and would lead to multiple legal wrangles for the industry post lifting of the current restrictions. The problems of the construction and engineering sectors in India is aggravated and difficult to address as there is no standard form or format for contracts followed by the industry. There could be innumerable variations in as many General and Special Conditions of a Construction and Engineering Contract. Although, standard forms of construction and engineering contracts by International Federation of Consulting Engineers (FIDIC), Institution of Civil Engineers (ICE) or Indian Institute of Architects (IIA) are widely adopted, but, at times they are zealously negotiated and hence modified/amended so as to lose uniformity. Additionally, there are separate standard forms of contracts adopted by the National Highway Authority of India (NHAI), Public Works Department (PWD), Delhi Metro Rail Corporation (DMRC), Central Public Works Department (CPWD), National Building Construction Corporation (NBCC), Model Engineering Procurement and Construction (EPC) and contract for construction works by Niti Aayog. The Ministry of Finance (Govt. of India) has issued various standard guidelines for contracts and procurement of works such as item rate contracts and lumpsum contracts, Model EPC Agreement byIndian Railways, etc., making it impossible to exhaustively deal with issues that could arise on account of Covid-19 and their solutions. The contractual implications as detailed by Julian Bailey *et al.* (2020) are many-fold. However, some of the common issues that could arise in some form in most of the construction and engineering contracts can be as follows:

FINDINGS

A. The toll on residential and commercial real estate

The exodus of migrant workers or informal sector workers (a bulk of whom find employment in the construction industry in Tier I and Tier II cities), took a toll on the supply chain due to a ban on inter-state travel. It also pushed up operating costs as commodity prices (raw materials for the construction industry) were in shortsupply. The demand for residential real estate was also on a back footing, as aspirational homeowners kept their purchase decisions on hold because of various reasons and the uncertainty triggered by the pandemic situation. Additionally, the uncertainty regarding cash flows discouraged the potential buyers to take on the additional burden of loans and EMIs. Home rentals too, took a dip as people renting apartments in the metropolitan cities choseto go back to their hometowns.

Commercial real estate demand also took a beating as work from home/remote work became the new normal that resulted in under-utilization of office spaces. Closure of malls, gyms, cinema theaters and eateries also killed the appetite for commercial infra space. The festival season beginning from October that normally gives a boost to residential purchase, failed to uplift the mood of the affordable segments of population from buying/investing in residential properties.

B. Negative impact on the construction sector and the lowering of GDP

Though the Union Government took a decision of recognizing the pandemic as a *Force Majeure* incident, the *onus* was on the construction industry to deal with the double whammy of Covid - 19 in addition to the already existing sluggish conditions. As the second biggest employment generator, the impact of Covid - 19 on the construction sector, thus led to the lowering of GDP not only in real estate but also several associated sectors. Although the economy of the country is on the recovery mode and steady progress on the administration of the vaccine, the revised standard operating practices with respect of usage of PPE, social distancing, personal hygiene etc. are resulting in the delay of under-development projects. This will further push up financing cost and continue to impact the stakeholders in the construction industry.

Time is the essence of contract

In many construction and engineering contracts, parties generally specify the time for completion and/or expressly state that time is the essence of the contract. A contractor should be careful about such clause(s), as any breach would make the contract voidable at the cost and consequence of the defaulting contractor. Alternatively, the contractor under force of law may be obligated to complete the project beyond the stipulated completion date and also pay compensation for delay to the opposite party/Employer. Section 55 of the Indian Contract Act, 1872 provides for the effect of failure to meet the specified timeline. However, the intention of the parties has to be looked at and not the letter of the clause. The time is generally considered to be the essence of the contract.

However, the Law in certain situations permits extension of

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time to the contractor. Generally, construction and engineering agreements also provide for a buffer period, beyond the stipulated completion date. Such conditions are generally subject to payment of damages or deductions from the payments due to the contractor. However, in case of failure to perform, even in the extended period(s), the aforementioned rigors of Section 55 of the Contract Act would be invoked against the defaulting contractor. It is stated that even in contracts, where time may not be the essence of the contract, upon delay in performance, the innocent party/employer may sue for any loss that may be caused by delay. Thus, it is imperative that any delay beyond the stipulated completion date, is condoned by the doctrine of *force majeure* or the doctrine of frustration of the contract can be applied in favour of the contractor. It is imperative to evaluate if Covid-19 can be considered as *force majeure* event or can be invoked for frustration of a contract.

SUGGESTIONS

Concrete measures to revive and revitalize

The need of the hour for the stakeholders is to unite to give a shot in the arm to the ailing construction sector. Concrete measures such as ensuring safety of informal labourers, increased remuneration to skilled work-force for early completion, removal of liquidity crunch by financial institutions, reduction of interest rates, one-time financing for those about to be completed structures etc. would help the sector overcome these timesof crisis.

The use of technology is going to redefine construction industry in days to come. Not only are stakeholders rethinking on the use of technology to minimize the impact of human capital shocks inthe form ofmigrant labor exodus, Government initiatives such as the Light House Projects in sixIndian cities that will showcase the use of new-age state of the art technology will reduce costs and accelerate the pace of construction in the sector.

II. CONCLUSION

1) Discussing on the effects of Covid-19 on global construction industry, The Civil Engineering Portal (2021) pinpoints the five most essential results for a more straightforward outlook on the situation. Some of the most important effects that created havoc around the world are: 1). The decline in import and export, 2). Reduction in manpower, 3). Decline in income, 4). Burden of paused construction works, and 5). Deduction in the budget. Summarizing the situation, it is essential to have a thorough rebuilding plan after an analysis of all the risksby each player in their respective universes and a proper execution of the plan which should primarily start with an announcement to all stakeholders including financial institutions about the plan so that stakeholders are satisfied and give their thumbs up to the road to recovery.

To say that the companies engaged in the construction and engineering sector, would be affected due to the current unprecedented situation would be an understatement. The various restrictions put in place by the Governments to control the effects of the virus may trigger shortage of raw material and manpower, disrupted supply chain, further creating handicaps in performing contractual obligations. Contraction in consumption demand should be the least of the worries for the sector. Some elements in construction and engineering are imported from countries, which may be more badly affected, creating a domino effect on the entire sector. However, one must safeguard against the inevitable by adopting corrective measures in time. The first step is to evaluate the contract clause(s)to ascertain the extent of liabilities upon breach and the last step is to proactively adopt all measures to mitigate the liability by timely invoking the correct legal doctrine(s).

Now here is the silverline. As per a study undertaken by Research And Markets.com (2021), the global construction market size is declined from USD 11,217.4 billion in 2019 to USD 10,741.2 billion in 2020. However, the industry is showing signs of recovery since the beginning of 2021 and reach a market size of USD 13,572.4 billion in 2024, projecting a CAGR of 6.0% between 2020 and 2024. It is also predicted that heavy and civil engineering sector will be the fastest-growing construction type during the forecast period. The suggestions which include concrete measures to revive and revitalize the construction industry includes safety of workers, increase remuneration to skilled work force.

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Do regulatory mechanisms affect corporate social performance? Evidence from emerging economies

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Abstract

This study examines the impact of corporate governance mechanisms on corporate social performance. The amount a given country spends on corporate social responsibility activities varies due to various motives. Therefore, the objectives of the study involve examining the impact of board characteristics and ownership structure on corporate social responsibility. Based on a panel data regression, this study finds that board size is positively related to corporate social performance (social performance and environmental performance) in the Chinese context. In the case of India and South Africa, board size exhibits a negative relationship, which is inversely related to China. CEO duality is positively related to firms' corporate social performance in India and China. However, in the context of South Africa, it exhibits a negative relationship. Gender diversity has positive impact in India and South Africa, wherein in case of China it is inversely related. It is observed that women on the board and women directors significantly influence corporate social responsibility spending. Moreover, among the ownership structure, family ownership is positively related to corporate social responsibility in the India and South Africa. The institutional investors have a negative impact in South Africa and a positive impact in India and China. This study supports the stewardship theory and agency theory and finds that firms should spend on corporate social responsibility activities to protect the interests of the stakeholders and the role of firms' responsibilities towards different sectors of society. Finally, this study provides insights into the state-of-the-art literature and offers practical implications for top-level management and shareholders.

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A STUDY ON THE INFLUENCE OF RELATIONSHIP MARKETING ON CUSTOMER CONCERNING ERNAKULAM

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ABSTRACT

Relationship marketing plays now that relationships have been recognized as a critical component of modern marketing theory and practice? This special issue aims to assess the current state of relationship marketing and request new ideas for bringing the subject forward. This research attempts to measure the influence of relationship marketing on customer concerns. It is Exploratory cum descriptive and causal research design was used. This research confirmed that relationship marketing, Components of relationship marketing like trust, Bonding, communications, customer attitude, and advertising effectiveness.

Keywords: Relationship Marketing, Trust, Bonding, Advertisement.

I. INTRODUCTION

Communication on an interpersonal level is used by a relationship marketing approach in order to sell products or services. Relationship marketing is a strategy that aims to boost a company's profitability by cultivating long term interactions between a business and its clients. A business will gather information on its customers and then utilise that data to provide them with better service, as well as discounts and freebies. Relationship marketing strategies include the use of customer loyalty programmes, such as discount grocery store club cards, frequent flyer rewards from airlines, and other types of customer loyalty programmes. Customers that are lucrative may be attracted to a business via the use of an effective relationship marketing approach.

Review of Literature

Relationship marketing is one of the most effective modern marketing tactics for companies to meet the requirements and desires of their customers. It is assumed that firms must use relationship marketing to meet the needs of their customers by establishing and sustaining long-term pleasant relationships with them(Veinampy & Sivesan,2012). It also implies that relationship marketing will allow for greater consumer pleasure. Relationship marketing aims to acquire, build, and maintain customer relationships (Berry & Parasuraman, 1991).

Objectives of the Study

1. To study the concepts of relationship marketing.
2. To examine the Components of relationship marketing.

Research methodology

The researcher has used secondary data. The secondary data came from various publications including journals and articles as well as reference books and websites.

Concepts and Components of Relationship marketing

In today's business world, in addition to formulating plans to bring in new clients and finalise transactions with those clients, organisations will also work to keep their existing clients and develop long-term connections with those clients. To put it another way, they are aware that losing a customer results in not only the loss of a single sale item, but also a significant loss of all future purchases that the customer may make during his or her lifetime, or during the period of time during which the consumer purchases the company's products. In other words, they understand that losing a customer results in a loss that is greater than the loss of a single sale item. To put it another way, businesses seek to maximise the revenue they get from each client throughout the course of their lifetime. Relationship marketing is a broad term that encompasses any and all efforts made by businesses to strengthen their bonds with valued customers by enhancing their level of awareness and the quality of the services they get.

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Relationship marketing is an ongoing process that entails finding and generating new values for consumers, in which the customers' and the company's joint interests take centre stage and are communicated with the client throughout the course of his or her lifetime. The exchange is an essential concept in the field of relationship marketing. The transmission of values through a variety of different channels is said to be the driving force behind marketing according to Ennewand. The parties in a business transaction have uneven bargaining power due to the disparity in the resources at their disposal. The two requirements that form the basis of any relationship are as follows: first, both parties have the expectation that they will benefit from the partnership. Second, both parties are obligated to continue working together for the foreseeable future. When it comes to relationship marketing, for instance, sellers could seek to cultivate a more intimate connection with buyers, while buyers might want to cultivate a network of reliable suppliers for themselves. Wong and Sohal's model of relationship marketing is a one-dimensional structure, and Figure 1 outlines the six most important aspects of this model.

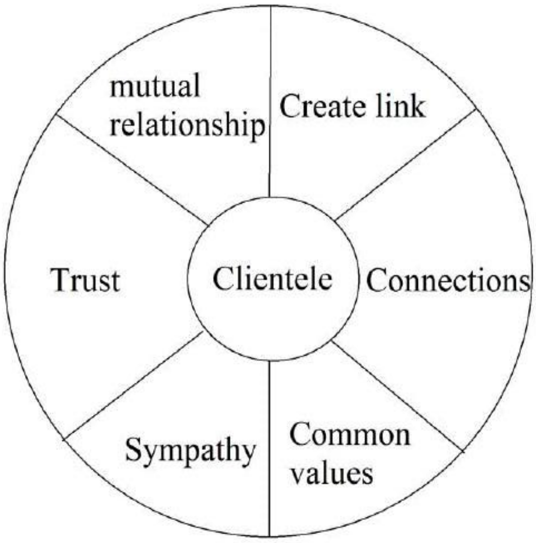

Figure 1: Relationship marketing components

Trust: Trust: Trust is an essential component of any economic relationship, as it indicates the degree to which each side in the partnership may depend on the assurances made by the other party. Trust is crucial in partnerships that tend to last for many years. Morgan and Hunt researched trust as an essential aspect of the relationship marketing paradigm. Increased trust between buyers and sellers leads to greater productivity and relationships that are maintained over the long term.

Bonding: Bonding is a part of how a buyer and a seller do business with each other, and it helps them reach their goal in an integrated setting. In addition, this part of relationship marketing leads to growth and more loyal customers, as well as an immediate sense of belonging to the relationship and an indirect sense of belonging to the company. Wilson and Malaneni found that buyers and sellers are more likely to work together to keep the relationship going when they have a stronger relationship.

Communications: Communication is when a buyer and a seller talk to each other in a formal or informal setting and share information that is useful and important. Anderson and Nurse say that communication is a key part of building trust. Morgan and Hunt's research shows that communication between the primary seller and the retailer in the auto sector has a positive and informal effect on their commitment. Communication is sometimes ignored in business interactions. It's sad because people use communication to learn about the other parts. Communication, especially communication that is timely, builds confidence by helping to settle disagreements and meet expectations.

Shared values: Shared values are the opinions that both people in a relationship have about specific behaviors, goals, and rules, no matter how important, right or wrong, they are. People with the same goals and values are more committed to each other.

Empathy: This part of relationship marketing lets both sides see the relationship from the other side's point of view. Empathy understands the needs and goals of the other person in a relationship. For the people involved in a transaction to get along better, they must show empathy.

Interaction: The reciprocal relationship is another part of relationship marketing. It sets up a system in which one party gets services or attention from the other party and, in return, gives the other party special services in the future. Elise and Jones said that "mutual influences and long-term commitments mark relationship marketing. The Chinese think that the interaction can be tailored to the needs of the customer so that the service provider (supplier) can create benefits for customers through exceptional services to compete with other market sectors (competitors)

Customer attitude

Customer attitudes are what a person thinks, feels, and does about business. Most of the time, these attitudes are formed by a combination of things. What happened in the past dramatically affects how people think and why they think the way they do.

Advertising effectiveness

One of the hardest things about advertising is figuring out how well it works. This means figuring out how well advertising costs much money helped us reach our goals. Measuring and analyzing how well advertising works is a common way to get feedback on the flaws and strengths of our advertising. By looking into the effects of advertising and how they relate to the organization's goals, organizations can change their advertising budget, message format, content, type of media and communication channels, and even when and how the promotion is launched. This will make the ads more useful and valuable than they were before. Advertising has many different and unique effects, so it is essential to use suitable scientific methods and approaches to tell one case from another and track an ad's effects over time. In addition, advertising changes people's knowledge, attitudes, and behaviors.

II. CONCLUSION

Companies that provide services, commercial goods, and institutions are increasingly choosing to sell themselves using this method since traditional marketing strategies lack the necessary efficiency and have become less feasible in the present context. In addition, most markets have developed to the point where they are now confronted with intense competition and a supply that exceeds the demand. Given the current state of affairs, acquiring new customers is very challenging. As a result, organizations and businesses have a solid and widespread recognition of the compelling need to keep their current customers. Because of these shifts, businesses will need to prepare themselves far to compete with other companies. Relationship marketing is a technique that reduces the expenses of acquiring new consumers while simultaneously boosting profitability. It is accomplished by developing and sustaining long-term relationships via the use of efficient advertising that is directed at existing customers.

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Work Life Balance During Work From Home For Indian Working Women During Covid -19

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Abstract

Work from Home (WFH) has become the order of the day for people world-wide during the pandemic of covid 19. The facility to access work away from the physical office environment was a common practice for many IT, IT enabled and banking services. However, this practice is continued during the Covid-19 pandemic for relatively a longer period. There are many factors which challenge the working women. Among them the "Location – Home" is a major influencing factor, putting some challenges on women in balancing their work and life. This affects their work performance negatively and creates an imbalance in their work and life. Traditionally the role of Indian Woman was restricted to cater to the needs of the family at home. Now women play a vital role in every sector and they are equally competent to perform in the work place too. In this context, the study conducted on Indian working women during pandemic. The factors namely, role conflict, role ambiguity, the presence of elderly parents, infant children were found as the major causes for their work life imbalance. Judgmental sampling method was chosen to collect the data from the population of working women in India. And it was found that there exists some challenge for women who work from home in balancing their work and life which are mainly depended on the demographic variables. It was found that, the presence of infant kids/elderly people at home; family members who do not involve in work from home, and children who do not have online classes were the major influencing factors. Coping strategies were suggested on the basis of subsequent interview and discussions from selected working women among the respondents.

Key words:- Work from home, work-life balance, role conflict, role ambiguity, time management, coping strategies.

1. Introduction

Work From Home (WFH) is a common practice in Information Technology (IT), IT enabled services and banking services. However it will be for a short period when an employee chose to work from home for a day or two based on his or her requirement. It is only for those particular employees who opt for work from home within the company's provisions/norms. The Corona virus outbreak lead to a world-wide lock down and people are forced to opt work from home irrespective of the sector/industry/geographical location etc. This situation differs from the normal work from home practice.

Traditionally the role of Indian woman was restricted to cater to the needs of the family at home. But now women play a vital role in every sector and they are equally competent to perform in work place. In this context, the study conducted on Indian working women to identify the challenges faced by them in their work life balance, while working from home, during the Corona Outbreak. The major factors which influence the work life balance of an individual and the specific demographic variables which were relevant in the said context were considered in this study. It is necessary to view the expectation of an Indian family on the women who are available at home for their services. The role conflict, the size and composition of the family play a vital role in determining the family expectations and the women's work at home.

2. Literature Review

(Crosbie, Tracey & Moore, Jeanne, 2004) Pointed out in that, professional women suffer the most personal conflict between their roles as homemakers and workers, as they tended to see these roles as equal.

(Mani, 2013) Revealed the factors namely, role conflict, lack of recognition, organizational politics, gender discrimination, elderly and children care issues, quality of health, problems in time management and lack of proper social support influence the work-life balance of women employees in the Indian context.

(Allen, 2013) Proved the factors (a) the focal employee's experience of work-to-family conflict and enrichment and (b) the attitudes of the employee's spouse/partner have its impact on employee work-life balance.

(Rangarajan and Balaji, 2014) They defined work-life balance as, maintenance of balance between responsibilities at work and at home. They also pointed out that work and family has become antagonist spheres, equally greedy of time and energy demanded from working women creates conflict. These conflicts are also lubricated by the cultural contradictions of motherhood and their self-fulfillment in demanding careers. They face difficulties in finding adequate time to children and elderly people at home.

(Brough P., Timms C., Chan x.W., Hawkes A., Rasmussel L, 2020) The authors discussed some of the antecedents and consequences of work-life balance with reference to the family demands and resources, personality antecedents, work demands and resources. They showed few future directions for research on work-life balance in the context of technological advancements and individual levels of mindfulness and resilience.

(Katz, 1978), Katz and Khan stated that when people play multiple roles at the same time shall lead to a greater role conflict. Married women invest considerable time in performing multiple roles at family and work place, as stated by time utilization studies by Hing 1984; Airmy et al. 1991 (Hing & al., 1984)

Role ambiguity discussed in this study is focusing on the confusing situation of women that emerges due to the work related to family and work related to office performed by them during work from home.

3. Objectives

- To identify the factors influencing the work-life balance of Indian working women while working from home during this pandemic period
- To find out the significant difference in the work life imbalance of Indian working women based on the demographic variables.
- To explore the strategies and coping mechanism used by Indian women to reduce these challenges.

4. Methodology

4.1 Research design

Descriptive research design was adopted for this study by identifying the literature background for factors influencing the work- life balance and assumptions drawn to identify its applicability in the said context.

4.2 Population

Indian working women adopted work from home during this pandemic period

4.3 Sample size

150 responses received from working women during the pandemic out of which 143 sample responses were analyzed after the cleaning and verifying of the data eliminating missing values.

4.4 Sampling Technique

Judgmental sampling method was used to select the respondents based on the researcher's knowledge on the suitability of the sample unit to incorporate the working women various sectors

4.5 Pilot study

A semi-structured questionnaire was designed and data collected from 25 working women using convenience sampling method as part of pilot study to test the reliability of the questionnaire. The chronbac alpha was measured using SPSS software and the alpha score was 0.948 which states that the instrument has 94% reliability.

4.6 Research instrument and data collection method

The semi-structured questionnaire containing 17 scale variables to measure work life imbalance and 5 demographic variables were incorporated to measure its impact on work life imbalance. The responses were collected from the target audience through Google forms.

4.7 Data analysis

SPSS was used as a software package to do the analysis. The statistical tools used to find out the results were, Percentage analysis, and ANOVA

5. Data Analysis and Interpretations

Percentage Analysis was used to demonstrate the demographic features of the respondents. One way ANOVA was performed to identify the significant difference in the work like imbalance on the basis of the demographic variables and work life balance of women based on the number of dependent elderly parents and children not attending online classes.

5.1 The demographic features of the data

Table 5.1.1 Age of the respondents

Age group	Frequency	Percentage
Less than 28	13	9.1
29 to 33	9	6.3
34 to 38	30	21.0
39 to 43	43	30.1
44 and above	48	33.6
Total	143	100

Source:- Primary Data

5.2 Data Analysis

The data to be viewed when the value of mean is more there is more work life imbalance as the scales were used to measure work life imbalance.

Table 5.2.1 (A) ANOVA for work life balance based on Age

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4254.889	4	1063.722	4.358	.002
Within Groups	33686.104	138	244.102		
Total	37940.993	142			

Table 5.2. 1 (B) Mean value for work life imbalance

Age_grouped	Mean	N	Std. Deviation
Less than 28	36.6923	13	14.85140
29 to 33	49.7778	9	13.20774
34 to 38	41.2333	30	13.81824
39 to 43	53.1395	43	15.16823
44 and above	44.3750	48	17.53007
Total	45.9930	143	16.34595

Inference:- It is interpreted from the Table 5.2.1 (A) that there is a significant difference in the work life balance of women as the F= 4.358 is significant at 95% confidence level as the p value is < 0.05. Further the Mean values shows that women at the age group of 39 to 43 faces high work life imbalance compared to the other age group and it is to be noted that the young women less than the age of 28 are have less work life imbalance.

Table 5.2.2 (A) ANOVA of work life imbalance based on the number of people at home excluding the respondent

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	6780.484	7	968.641	4.197	.000
Within Groups	31160.509	135	230.819		
Total	37940.993	142			

Source : Primary Data

Table 5.2.2 (B) Mean value of work life imbalance

Total Number members in family	Mean	N	Std. Deviation
1.00	58.1111	9	15.28434
2.00	47.4054	37	17.30520
3.00	51.8696	23	16.40483
4.00	38.2000	40	13.75463
5.00	42.0769	13	20.83451
6.00	56.3077	13	.48038
7.00	37.0000	4	.00000
8.00	38.0000	4	.00000
Total	45.9930	143	16.34595

Inference:- It is evident from the above table 5.1.2 A that, there is a significant difference in the work life balance of women based on the number of members in their family. The value F= 4.197 is significant at 99% confidence level, as the p value is less than 0.01. It is further found that the work life imbalance is high for women who have 1 to 3 additional members in their family. However there is no specific pattern of increase in the imbalance which can be predicted based on the number of members in their family.

Table 5.2.3 ANOVA for work life balance based on the type of occupation of women

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	1459.358	3	486.453	1.853	.140
Within Groups	36481.635	139	262.458		
Total	37940.993	142			

Source:- Primary data

Inference:- As the p value for the F=1.853 is greater than 0.05, it is interpreted that there is no significant difference found in this data set for the work life balance of women based on their nature of occupation.

Table 5.2.4(A) ANOVA for work life balance based on the number of non-working members at home

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4336.581	6	722.763	2.925	.010
Within Groups	33604.412	136	247.091		
Total	37940.993	142			

Source:- Primary data

Table 5.2.4(B) Mean value for the work life imbalance based on number of non -working members

Total Number of members not working	Mean	N	Std. Deviation
0.00	46.7826	23	18.93039
1.00	57.7500	20	14.24180
2.00	43.3774	53	16.27791
3.00	43.3704	27	16.09383
4.00	44.0000	8	13.89758
5.00	56.0000	4	.00000
7.00	37.5000	8	.53452
Total	45.9930	143	16.34595

Inference:- It can be interpreted from the table 5.2.4 (A), that, there is a significant difference in the work life balance of women based on the number of non-working members at home. The F=2.925 is significant as the p value is < 0.05. This also can be viewed that the non-working spouse, elderly parents and non-school going children are the dependents for the women at home and this create an atmosphere for them at home to serve them on their requirements. On the other hand the working spouse of school going children will be engaged in their work create a space for the women to work from home without such challenges. The mean table 5.2.4 (B) shows women having one dependent member, are facing more work life imbalance compared to others.

6. Results and Discussions

It is found that the Role conflict, role ambiguity, elderly and children care issues, time schedules allocation and lack of social support are the major factors which influences the work-life balance of women working from home during this lock down period. The work place "home – As the location", also influences degree of imbalance in work-life on contrary to many research comments of work from home as an option to reduce work-life imbalance. However in this study the context of work from home is totally different compared to the normal one.

The working women found it difficult to convince the elderly parents and their children on their unavailability for serving them when working from home. The elderly parents/ children feel the physical presence of their daughter/mother at home and are unavailable for their service due to office work. This problem can be rectified with the solution discussed by Dr. Marisa D'Mello, in the Deccan Chronicle, narrated that, balancing work and life is a myth because the passionate workers need not attempt to balance the two instead work-life integration is to be practiced. Few Passionate professionals disagreed to the work-life imbalance is because of this passionate approach.

It is found that the degree of work life balance of women employees significantly differ based on the demographic features. The Mean values (Table 5.2.1 (B) shows that women at the age group of 39 to 43 faces high work life imbalance compared to the other age group and it is to be noted that the young women less than the age of 28 are have less work life imbalance. This is due to the change in the family atmosphere for the young generation and the type of responsibility they have at that age. The elderly women having more responsibility towards to elderly parents and the tradition mind set of the old generation Indian families.

The number of dependent family members present at home, the understanding of spouse, and industry/sector in which the employee works. There is a significant difference in the work life imbalance of women based on the presence of non-working members in their family. This is viewed from the angle that the working spouse and school going children who attend classes online are engaged in their work. This will give the working women a space for focusing on their work. The work life balance has not shown any significant different based on the nature of occupation. This only can be viewed as a coincidence of the data composition.

6.1 Coping strategies

The work life imbalance of Indian working women can be resolved based on the change in the mind set of Indian families. Women who are working professionals suggested that the nature of imbalance is temporary only for some initial months of working from. As the family members understand that the work from home is equally important as the women work from office and they are not available for the services of the family members during the working hours. However it is to be noted that the working time also got extended when people work from home. It is not like working for a specific time period as in the case of normal working at office. Above all the best way to balance the work life is, work life integration. Women need to educate the elderly parent and children that they are at their office work. Women can fix a specific room for them to work at home which will create them an atmosphere free from distractions. Proper planning of their work schedules at home will help them for better work life balance.

6.2 Conclusion

It is concluded with evidence that there are factors significantly influence the work-life balance of Indian women namely, role conflict, role ambiguity, dependent elderly parents and children. The location-Home plays a vital important factor which is a challenge for the women employees to attend office work and homely responsibilities at the same time. This study can be further extended focusing on work-life integration.

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A STUDY ON THE INFLUENCE OF RELATIONSHIP MARKETING ON CUSTOMER CONCERNING ERNAKULAM

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ABSTRACT

Relationship marketing plays now that relationships have been recognized as a critical component of modern marketing theory and practice? This special issue aims to assess the current state of relationship marketing and request new ideas for bringing the subject forward. This research attempts to measure the influence of relationship marketing on customer concerns. It is Exploratory cum descriptive and causal research design was used. This research confirmed that relationship marketing, Components of relationship marketing like trust, Bonding, communications, customer attitude, and advertising effectiveness.

Keywords: Relationship Marketing, Trust, Bonding, Advertisement.

I. INTRODUCTION

Communication on an interpersonal level is used by a relationship marketing approach in order to sell products or services. Relationship marketing is a strategy that aims to boost a company's profitability by cultivating long term interactions between a business and its clients. A business will gather information on its customers and then utilise that data to provide them with better service, as well as discounts and freebies. Relationship marketing strategies include the use of customer loyalty programmes, such as discount grocery store club cards, frequent flyer rewards from airlines, and other types of customer loyalty programmes. Customers that are lucrative may be attracted to a business via the use of an effective relationship marketing approach.

Review of Literature

Relationship marketing is one of the most effective modern marketing tactics for companies to meet the requirements and desires of their customers. It is assumed that firms must use relationship marketing to meet the needs of their customers by establishing and sustaining long-term pleasant relationships with them(Veinampy & Sivesan,2012). It also implies that relationship marketing will allow for greater consumer pleasure. Relationship marketing aims to acquire, build, and maintain customer relationships (Berry & Parasuraman, 1991).

Objectives of the Study

1. To study the concepts of relationship marketing.
2. To examine the Components of relationship marketing.

Research methodology

The researcher has used secondary data. The secondary data came from various publications including journals and articles as well as reference books and websites.

Concepts and Components of Relationship marketing

In today's business world, in addition to formulating plans to bring in new clients and finalise transactions with those clients, organisations will also work to keep their existing clients and develop long-term connections with those clients. To put it another way, they are aware that losing a customer results in not only the loss of a single sale item, but also a significant loss of all future purchases that the customer may make during his or her lifetime, or during the period of time during which the consumer purchases the company's products. In other words, they understand that losing a customer results in a loss that is greater than the loss of a single sale item. To put it another way, businesses seek to maximise the revenue they get from each client throughout the course of their lifetime. Relationship marketing is a broad term that encompasses any and all efforts made by businesses to strengthen their bonds with valued customers by enhancing their level of awareness and the quality of the services they get.

Relationship marketing is an ongoing process that entails finding and generating new values for consumers, in which the customers' and the company's joint interests take centre stage and are communicated with the client throughout the course of his or her lifetime. The exchange is an essential concept in the field of relationship marketing. The transmission of values through a variety of different channels is said to be the driving force behind marketing according to Ennewand. The parties in a business transaction have uneven bargaining power due to the disparity in the resources at their disposal. The two requirements that form the basis of any relationship are as follows: first, both parties have the expectation that they will benefit from the partnership. Second, both parties are obligated to continue working together for the foreseeable future. When it comes to relationship marketing, for instance, sellers could seek to cultivate a more intimate connection with buyers, while buyers might want to cultivate a network of reliable suppliers for themselves. Wong and Sohal's model of relationship marketing is a one-dimensional structure, and Figure 1 outlines the six most important aspects of this model.

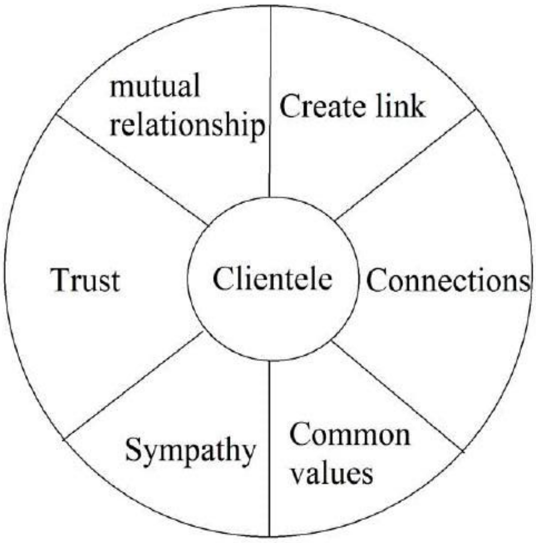

Figure 1: Relationship marketing components

Trust: Trust: Trust is an essential component of any economic relationship, as it indicates the degree to which each side in the partnership may depend on the assurances made by the other party. Trust is crucial in partnerships that tend to last for many years. Morgan and Hunt researched trust as an essential aspect of the relationship marketing paradigm. Increased trust between buyers and sellers leads to greater productivity and relationships that are maintained over the long term.

Bonding: Bonding is a part of how a buyer and a seller do business with each other, and it helps them reach their goal in an integrated setting. In addition, this part of relationship marketing leads to growth and more loyal customers, as well as an immediate sense of belonging to the relationship and an indirect sense of belonging to the company. Wilson and Malaneni found that buyers and sellers are more likely to work together to keep the relationship going when they have a stronger relationship.

Communications: Communication is when a buyer and a seller talk to each other in a formal or informal setting and share information that is useful and important. Anderson and Nurse say that communication is a key part of building trust. Morgan and Hunt's research shows that communication between the primary seller and the retailer in the auto sector has a positive and informal effect on their commitment. Communication is sometimes ignored in business interactions. It's sad because people use communication to learn about the other parts. Communication, especially communication that is timely, builds confidence by helping to settle disagreements and meet expectations.

Shared values: Shared values are the opinions that both people in a relationship have about specific behaviors, goals, and rules, no matter how important, right or wrong, they are. People with the same goals and values are more committed to each other.

Empathy: This part of relationship marketing lets both sides see the relationship from the other side's point of view. Empathy understands the needs and goals of the other person in a relationship. For the people involved in a transaction to get along better, they must show empathy.

Interaction: The reciprocal relationship is another part of relationship marketing. It sets up a system in which one party gets services or attention from the other party and, in return, gives the other party special services in the future. Elise and Jones said that "mutual influences and long-term commitments mark relationship marketing. The Chinese think that the interaction can be tailored to the needs of the customer so that the service provider (supplier) can create benefits for customers through exceptional services to compete with other market sectors (competitors)

Customer attitude

Customer attitudes are what a person thinks, feels, and does about business. Most of the time, these attitudes are formed by a combination of things. What happened in the past dramatically affects how people think and why they think the way they do.

Advertising effectiveness

One of the hardest things about advertising is figuring out how well it works. This means figuring out how well advertising costs much money helped us reach our goals. Measuring and analyzing how well advertising works is a common way to get feedback on the flaws and strengths of our advertising. By looking into the effects of advertising and how they relate to the organization's goals, organizations can change their advertising budget, message format, content, type of media and communication channels, and even when and how the promotion is launched. This will make the ads more useful and valuable than they were before. Advertising has many different and unique effects, so it is essential to use suitable scientific methods and approaches to tell one case from another and track an ad's effects over time. In addition, advertising changes people's knowledge, attitudes, and behaviors.

II. CONCLUSION

Companies that provide services, commercial goods, and institutions are increasingly choosing to sell themselves using this method since traditional marketing strategies lack the necessary efficiency and have become less feasible in the present context. In addition, most markets have developed to the point where they are now confronted with intense competition and a supply that exceeds the demand. Given the current state of affairs, acquiring new customers is very challenging. As a result, organizations and businesses have a solid and widespread recognition of the compelling need to keep their current customers. Because of these shifts, businesses will need to prepare themselves far to compete with other companies. Relationship marketing is a technique that reduces the expenses of acquiring new consumers while simultaneously boosting profitability. It is accomplished by developing and sustaining long-term relationships via the use of efficient advertising that is directed at existing customers.

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An Analysis of Data Science and its Applications

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Abstract — Data Science is a combination of multiple disciplines such as statistics, data analysis and machine learning that are used to perform data analysis and to extract knowledge from it. It is used to find patterns of data through data analysis and thereby make decisions. Through data science, organizations are able to make better decisions, predictive analysis and pattern discoveries. In this paper, some of the data science applications created through pycharm software are explained of about how each application would read data from csv, excel, json and mongodb to produce patterns of data and an explanation of several applications of data science has been provided.

Keywords—python, pandas, mongodb, json, pycharm

I. Introduction

Data Science is used in various organizations of the world today such as banking, consultancy, healthcare, and manufacturing. Data Science is needed for route planning so as to discover the best routes to ship, to foresee delays for flight/ship/train etc. by means of predictive analysis, to create promotional offers, to find the best suited time to deliver goods, to forecast the next years revenue for a company, to analyse health benefit of training, to predict who will win elections etc. Data Science is applied in every part of a business where data is available. Examples are Consumer goods, Stock markets, Industry, Politics, Logistic companies, E-commerce. Data Scientist jobs are one of the most demanding jobs in the present era. A Data Scientist requires expertise in several backgrounds such as Machine Learning, Statistics, Programming (Python or R), Mathematics, Databases. A Data Scientist must find patterns within the data. Before patterns are found, data must be organized in a standard format. The data scientist should be able to understand the business problem, explore and collect data from database, web logs, customer feedback, etc., extract the data and transform the data to a standardized format, clean the data by removing erroneous values from the data, find and replace missing values such as checking for missing values and replace them with a suitable value, normalize data by scaling the values in a practical range, analyse data, find patterns and make future predictions, represent the result by presenting the result with useful insights in a way the organization can understand.

This paper is organized as follows. First, how the various data science applications created through pycharm software read data from csv, excel, json and mongodb to produce patterns of data are explained. An introduction of how to install pycharm and what all libraries are needed (pandas and pymongo) are also explained. Later on, what are the application areas of data science are also explained.

II. Analysis

Creating a data science application using pandas library in python

The pandas library

Pandas is the most popular python library used for data analysis. It provides highly optimized performance with back-end source code purely written in C or Python. It allows importing data from various file formats such as csv, JSON, NoSQL and relational databases, Microsoft Excel etc. Also, it allows various data manipulation operations such as selecting, merging, reshaping as well as features such as data cleaning and data wrangling. Pandas is built on the top of two Python libraries—matplotlib for data visualization and NumPy for mathematical operations. Pandas acts as a wrapper over these libraries that allows you to access many of matplotlib's and NumPy's methods with lesser amount of code.

The analyzation of data in pandas is done with series and Data frames data structures. These data structures are built on the top of the NumPy array which makes them fast and efficient. Series is a 1D array defined in pandas which can store any data type whereas Data frames is a 2D array defined in pandas consisting of rows and columns. Data frames are widely used and is the most important data structure.

Series

It is a 1D data structure based on homogeneous data.

10	36	72	84	97

The key points of Series are that it is homogeneous data, their size is immutable and their data values are mutable.

Data frames

It is a 2D data structure based on heterogeneous data.

Name	Address	Rating
Sarva	Kochi	5
Pandaris	Kochi	4
Ifthar	Kochi	4

The key points of Data frames are that it is heterogeneous data, their size is mutable and their data values are mutable.

How to install pandas library in pycharm python IDE

If you are using pycharm python IDE, follow the steps below to install *pandas* library;

- From your pycharm IDE Menu, open File > Settings.
- From the dialog box obtained, select your data science project that you have developed (**Project:dsproj**). *dsproj* is my data science project created in pycharm.
- When you select your project in python, it will display with two options such as Python Interpreter and Project Structure.
- Click on the option Python Interpreter.
- From the options displayed, click the small **+** symbol appearing at the top to add a new library to the project.
- We need the *pandas* library to be installed, so type pandas.
- When you type pandas, all the supporting libraries of *pandas* will be displayed. Now, click the button *Install Package*.
- After the successive installation, you will obtain the message such as *pandas* libraries have been successfully installed. Now terminate and close all the windows.

Python data processing

After installing *pandas* library in pycharm python editor, we could perform python data processing on csv, Excel and JSON. The data processing is done as follows;

Reading from csv file

In Data Science, reading data from CSV is a fundamental aspect. The data from various sources are exported to CSV format so that they could be used by other systems. The Pandas library used with python provides features using which we can read the CSV file completely as well as in sub sections, that is, for selected group of rows and columns.

If you have a csv file named ***dsdata.csv*** as follows;

```
ID,Name of Employee,Salary,Joining date,Department
1,Mariadas Ronnie C P,35000,2016-06-13,CA
2,Ranjith S,35000,2019-09-23,CA
3,Sudha D,36000,2015-11-15,CA
4,Anjana S Chandran,45000,2009-05-11,CA
5,Praveen Kamath,65000,2007-03-27,CA
6,Jisha Liju Daniel,36000,2016-06-1,CA
7,Lakshmi Mahesh,45000,2007-07-30,CA
8,Jismy Joseph,36000,2015-09-17,CA
9,Shoby Sunny,36000,2016-06-01,CA
10,Vidya Gopinath,35000,2019-07-17,CA
11,Remya Raveendran,35000,2019-06-17,CA
12,Bindu John,36000,2015-06-17,CA
13,Anitha G Krishnan,36000,2017-04-17,CA
14,Arun Krishnan,36000,2017-05-17,BCom
15,Sujith,36000,2015-06-17,BCom
16,Arsha P B,36000,2014-06-17,BCom
17,Satheesh,36000,2015-07-17,BA
18,Rose Paul,36000,2016-06-01,BA
19,Binu V S,40000,2014-06-17,MBA
20,Vignesh Karthik,40000,2014-09-17,MBA
```

To run in pycharm, we have to save the csv file in your data science project folder. For example, in your ***PycharmProjects*** folder, where you are saving your python projects, save this file as ***dsdataex.csv*** . After this, we need to design a python code as follows;

```
import pandas as pd
data = pd.read_csv('dsdataex.csv')

#Reading a csv file

print (data)
print()

#Reading specific rows

print (data[0:5]['Salary'])
print()

#Reading specific columns

print (data.loc[:,['Salary','Name of Employee']])
print()

#Reading specific columns and rows

print (data.loc[[1,3,5],['Salary','Name of Employee']])
print()

#Reading specific columns for a range of rows

print (data.loc[2:6,['Salary','Name of Employee']])
```

The first statement imports the pandas library features into pd.

The read_csv function is used read the content of the CSV file as a pandas DataFrame into the python environment.

The python code uses the library pandas in order to execute the csv file in order to produce the outputs as follows;

#Output for Reading a csv file

```
   ID  Name of Employee     Salary Joining date Department
0   1  Mariadas Ronnie C P  35000   2016-06-13    CA
1   2  Ranjith S            35000   2019-09-23    CA
2   3  Sudha D              36000   2015-11-15    CA
3   4  Anjana S Chandran    45000   2009-05-11    CA
4   5  Praveen Kamath       65000   2007-03-27    CA
5   6  Jisha Liju Daniel    36000   2016-06-1     CA
6   7  Lakshmi Mahesh       45000   2007-07-30    CA
7   8  Jismy Joseph         36000   2015-09-17    CA
8   9  Shoby Sunny          36000   2016-06-01    CA
9  10  Vidya Gopinath       35000   2019-07-17    CA
10 11  Remya Raveendran     35000   2019-06-17    CA
11 12  Bindu John           36000   2015-06-17    CA
12 13  Anitha G Krishnan    36000   2017-04-17    CA
13 14  Arun Krishnan        36000   2017-05-17   BCom
14 15  Sujith               36000   2015-06-17   BCom
15 16  Arsha P B            36000   2014-06-17   BCom
16 17  Satheesh             36000   2015-07-17   BA
```

17 18 Rose Paul   36000   2016-06-01   BA
18 19 Binu V S   40000   2014-06-17   MBA
19 20 Vignesh Karthik   40000   2014-09-17   MBA

#Output for Reading specific rows

0   35000
1   35000
2   36000
3   45000
4   65000

#Output for Reading specific rows and columns

Salary   Name of Employee
0   35000 Mariadas Ronnie C P
1   35000 Ranjith S
2   36000 Sudha D
3   45000 Anjana S Chandran
4   65000 Praveen Kamath
5   36000 Jisha Liju Daniel
6   45000 Lakshmi Mahesh
7   36000 Jismy Joseph
8   36000 Shoby Sunny
9   35000 Vidya Gopinath
10   35000 Remya Raveendran
11   36000 Bindu John
12   36000 Anitha G Krishnan
13   36000 Arun Krishnan
14   36000 Sujith
15   36000 Arsha P B
16   36000 Satheesh
17   36000 Rose Paul
18   40000 Binu V S
19   40000 Vignesh Karthik

#Output for Reading specific columns and rows

Salary   Name of Employee
1   35000 Ranjith S
3   45000 Anjana S Chandran
5   36000 Jisha Liju Daniel

#Output for Reading specific columns for a range of rows

Salary   Name of Employee
2   36000 Sudha D
3   45000 Anjana S Chandran
4   65000 Praveen Kamath
5   36000 Jisha Liju Daniel
6   45000 Lakshmi Mahesh

Reading from excel file

MS Excel is a widely used spread sheet program. Today, it is a widely used tool in Data Science. The Pandas library used with python provides features using which we can read the excel file completely as well as in sub sections, that is, for selected group of rows and columns. We could also read excel file with multiple sheets in it. To read excel file, the function read_excel is used.

If you have created a new project to design a data science program to read the contents of an excel file using pycharm, you have to install packages such as *pandas* and *openpyxl.*

If you have an excel file named ***inputdata.xlsx*** as follows;

#Data in Sheet 1

ID	Name of Employee	Salary	Joining date	Department
1,	Mariadas Ronnie C P,	35000,	13-06-2016,	CA
2,	Ranjith S,	35000,	23-09-2019,	CA
3,	Sudha D,	36000,	15-11-2015,	CA
4,	Anjana S Chandran,	45000,	11-05-2009,	CA
5,	Praveen Kamath,	65000,	27-03-2007,	CA
6,	Jisha Liju Daniel,	36000,	01-06-2016,	CA
7,	Lakshmi Mahesh,	45000,	30-07-2007,	CA
8,	Jismy Joseph,	36000,	17-09-2015,	CA
9,	Shoby Sunny,	36000,	01-06-2016,	CA
10,	Vidya Gopinath,	35000,	17-07-2019,	CA
11,	Remya Raveendran,	35000,	17-06-2019,	CA
12,	Bindu John,	36000,	17-06-2015,	CA
13,	Anitha G Krishnan,	36000,	17-04-2017,	CA
14,	Arun Krishnan,	36000,	17-05-2017,	BCom
15,	Sujith,	36000,	17-06-2015,	BCom
16,	Arsha P B,	36000,	17-06-2014,	BCom
17,	Satheesh,	36000,	17-07-2015,	BA
18,	Rose Paul,	36000,	01-06-2016,	BA
19,	Binu V S,	40000,	17-06-2014,	MBA
20,	Vignesh Karthik,	40000,	17-09-2014,	MBA

#Data in Sheet 2

ID	Name of Employee	Zipcode
1	Mariadas Ronnie C P	682002
2	Ranjith S	686796
3	Sudha D	694778
4	Anjana S Chandran	677277

5	Praveen Kamath	698987
6	Jisha Liju Daniel	665100
7	Lakshmi Mahesh	656743
8	Jismy Joseph	687457
9	Shoby Sunny	689799
10	Vidya Gopinath	672001
11	Remya Raveendran	683567
12	Bindu John	687567
13	Anitha G Krishnan	694534
14	Arun Krishnan	672008
15	Sujith	682015
16	Arsha P B	689142
17	Satheesh	702132
18	Rose Paul	702193
19	Binu V S	718348
20	Vignesh Karthik	729494

To run in pycharm, we have to save the excel file in your data science project folder. For example, in your ***PycharmProjects*** folder, where you are saving your python projects, save this file as ***inputdata.xlsx*** . After this, we need to design a python code as follows;

```
import pandas as pd
data = pd.read_excel('inputdata.xlsx')



#Reading an excel file

print (data)

#Reading specific rows and columns

print (data.loc[[1,3,5],['Salary','Name of Employee']])


#Reading multiple sheets

with pd.ExcelFile('inputdata.xlsx') as xls:
    data1 = pd.read_excel(xls, 'Sheet1')
    data2 = pd.read_excel(xls, 'Sheet2')

print("****Output Sheet 1****")
print (data1[0:5]['Name of Employee'])
print("")
print("***Output Sheet 2****")
print (data2[0:5]['Zipcode'])
```

The first statement imports the pandas library features into pd.

The read_excel function is used read the content of the excel file as a pandas DataFrame into the python environment. By default, the data is read from Sheet 1.

We can read specific rows and columns from the excel sheet as the same way as reading specific rows and columns from a csv file. Also, we can read data from multiple sheets in an excel file using the logic given in the program above. The *ExcelFile* function parses the file *inputdata.xlsx* into a Data frame.

The python code uses the library *pandas* and *openpyxl* in order to execute the excel file in order to produce the outputs as follows;

#Output for Reading an excel file

```
   ID,  Name of Employee, Salary, Joining date, Department
0  1, Mariadas Ronnie C P,35000,   13-06-2016,   CA
1  2, Ranjith S,            35000,   23-09-2019,   CA
2  3, Sudha D,              36000,   15-11-2015,   CA
3  4, Anjana S Chandran,    45000,   11-05-2009,   CA
4  5, Praveen Kamath,       65000,   27-03-2007,   CA
5  6, Jisha Liju Daniel,    36000,   01-06-2016,   CA
6  7, Lakshmi Mahesh,       45000,   30-07-2007,   CA
7  8, Jismy Joseph,         36000,   17-09-2015,   CA
8  9, Shoby Sunny,          36000,   01-06-2016,   CA
9  10,Vidya Gopinath,       35000,   17-07-2019,   CA
10 11,Remya Raveendran,     35000,   17-06-2019,   CA
11 12,Bindu John,           36000,   17-06-2015,   CA
12 13,Anitha G Krishnan,    36000,   17-04-2017,   CA
13 14,Arun Krishnan,        36000,   17-05-2017,   BCom
14 15,Sujith,               36000,   17-06-2015,   BCom
15 16,Arsha P B,            36000,   17-06-2014,   BCom
16 17,Satheesh,             36000,   17-07-2015,   BA
17 18,Rose Paul,            36000,   01-06-2016,   BA
18 19,Binu V S,             40000,   17-06-2014,   MBA
19 20,Vignesh Karthik,      40000,   17-09-2014,   MBA
```

#Output for Reading specific rows and columns in an excel file

```
   Salary   Name of Employee
1  35000,   Ranjith S,
3  45000,   Anjana S Chandran,
5  36000,   Jisha Liju Daniel,
```

#Output for Reading multiple sheets in an excel file

```
****Output Sheet 1****
0   Mariadas Ronnie C P,
1   Ranjith S,
2   Sudha D,
3   Anjana S Chandran,
4   Praveen Kamath,

****Output Sheet 2****
0   682002
1   686796
2   694778
3   677277
4   698987
```

Reading from JSON file

JSON stands for Javascript object notation. It is used for storing and transporting data, such as, sending data from server to a web page, sending data between servers, web applications and web connected devices. Its format is text-only, so that the data could be easily transmitted between computers and could be used by any programming languages.

When there is a large dataset of JSON, working with it to extract data could be very difficult if they are large enough to fit in memory. In these situations, we need to use python and pandas library which contains supporting functions to analyse and explore the JSON data. To read JSON file using python, the pandas library function read_json is used.

If you have created a new project to design a data science program to read the contents of a JSON file using pycharm, you have to install packages such as *pandas in your project*.

If you have a JSON file named ***input.json*** as follows;

```
{
  "ID":["1","2","3","4","5","6","7","8" ],
  "Name":["Mariadas Ronnie C P","Ranjith S","Sudha D","Anjana S Chandran","Praveen Kamath","Sujith","Satheesh","Binu V S" ],

"Salary":["35000","35000","36000","45000","65000","36000","36000","40000" ],
  "Joining Date":[ "13-06-2016","23-09-2019","15-11-2015","11-05-2009","27-03-2007","17-06-2015", "17-07-2015","17-06-2014"],
  "Dept":[
"CA","CA","CA","CA","CA","BCom","BA","MBA"]
}
```

To run in pycharm, we have to save the JSON file in your data science project folder. For example, in your ***PycharmProjects*** folder, where you are saving your python projects, save this file as ***input.json***. After this, we need to design a python code as follows;

```
import pandas as pd
data = pd.read_json("input.json")

# Reading a JSON file
print(data)

# Reading specific rows and columns
print (data.loc[[1,3,5],['Salary','Name']])

# Reading JSON file as records
print(data.to_json(orient='records', lines=True))
```

The read_json function is used read the content of the JSONfile as a pandas DataFrame into the python environment.

We can read specific rows and columns from the JSON file as the same way as reading specific rows and columns from an excel and a csv file. The *to_json* function is used to display JSON file contents into individual records.

The python code uses the library *pandas* in order to execute the JSON file in order to produce the outputs as follows;

 # Output for Reading a JSON file

	ID	Name	Salary	Joining Date	Dept
0	1	Mariadas Ronnie C P	35000	13-06-2016	CA
1	2	Ranjith S	35000	23-09-2019	CA
2	3	Sudha D	36000	15-11-2015	CA
3	4	Anjana S Chandran	45000	11-05-2009	CA
4	5	Praveen Kamath	65000	27-03-2007	CA
5	6	Sujith	36000	17-06-2015	BCom
6	7	Satheesh	36000	17-07-2015	BA
7	8	Binu V S	40000	17-06-2014	MBA

 # Output for Reading specific rows and columns

	Salary	Name
1	35000	Ranjith S
3	45000	Anjana S Chandran
5	36000	Sujith

 # Output for Reading JSON file as records

```
{"ID":1,"Name":"Mariadas Ronnie C P","Salary":35000,"Joining Date":"13-06-2016","Dept":"CA"}
{"ID":2,"Name":"Ranjith S","Salary":35000,"Joining Date":"23-09-2019","Dept":"CA"}
{"ID":3,"Name":"Sudha D","Salary":36000,"Joining Date":"15-11-2015","Dept":"CA"}
{"ID":4,"Name":"Anjana S Chandran","Salary":45000,"Joining Date":"11-05-2009","Dept":"CA"}
{"ID":5,"Name":"Praveen Kamath","Salary":65000,"Joining Date":"27-03-2007","Dept":"CA"}
{"ID":6,"Name":"Sujith","Salary":36000,"Joining Date":"17-06-2015","Dept":"BCom"}
{"ID":7,"Name":"Satheesh","Salary":36000,"Joining Date":"17-07-2015","Dept":"BA"}
{"ID":8,"Name":"Binu V S","Salary":40000,"Joining Date":"17-06-2014","Dept":"MBA"}
```

Reading from Mongodb

Mongodb is an object oriented, simple, dynamic, NoSQL database. In Mongodb, data are stored as a collection instead of storing as rows and columns as in a traditional RDBMS. Mongodb database support dynamic database schema which makes them responsive to the change in the structure of data. That is why, it is so popular in the field of data science.

To work Mongodb with pycharm, you need to install mongodb driver package in pycharm which is *pymongo*. On your new project, select settings->your project name->python interpreter. From there, install the package pymongo. After successful installation of *pymongo*, use the statement in the pycharm project code editor as follows to check whether the python package works successfully;

Import pymongo

If your project runs successfully without bugs, it means that your pymongo package is installed successfully.

A python code is designed as follows to demonstrate inserting and finding records in a Mongodb database;

```
import pymongo
myclient =
pymongo.MongoClient("mongodb://localhost:27017/")
#Creating database
mydb = myclient["employee"]
#Creating collection
mycol = mydb["faculty"]
#Creating records
mylist = [
{ "_id": 1,"name": "Mariadas Ronnie C P", "address":
"Mattancherry"},
{ "_id": 2,"name": "Ranjith S", "address":
"Chottanikkara"},
{ "_id": 3,"name": "Sudha D", "address": "Aluva"},
{ "_id": 4,"name": "Anjana S Chandran", "address":
"Palarivattom"},
{ "_id": 5,"name": "Praveen Kamath", "address":
"Thammanam"},
{ "_id": 6,"name": "Jisha Liju Daniel", "address":
"Kakkanad"},
{ "_id": 7,"name": "Lakshmi Mahesh", "address":
"Ernakulam"},
{ "_id": 8,"name": "Jismy Joseph", "address":
"Perumbavoor"},
{ "_id": 9,"name": "Shoby Sunny", "address":
"Kakkanad"},
{ "_id": 10,"name": "Vidya Gopinath", "address":
"Ernakulam"},
{ "_id": 11,"name": "Remya Raveendran", "address":
"Kaladi"},
{ "_id": 12,"name": "Bindu John", "address": "Mala"},
{ "_id": 13,"name": "Anitha G Krishnan", "address":
"Ernakulam"},
{ "_id": 14,"name": "Arun Krishnan", "address":
"Ernakulam"},
{ "_id": 15,"name": "Sujith", "address": "Edakochi"},
{ "_id": 16,"name": "Arsha P B", "address": "Ernakulam"},
{ "_id": 17,"name": "Satheesh", "address": "Pambakuda"},
{ "_id": 18,"name": "Rose Paul", "address": "Ernakulam"},
{ "_id": 19,"name": "Binu V S", "address": "Trivandrum"},
{ "_id": 20,"name": "Vignesh Karthik", "address":
"Tirunelveli"}
]
#Insert records
x = mycol.insert_many(mylist)
#Find specific records
res = mycol.find({"address": "Ernakulam"})
for x in res:
print(x)
#Updating records
oldvalue = { "address": "Mattancherry" }
newvalue = { "$set": { "address": "Fort Kochi" } }
mycol.update_one(oldvalue, newvalue)
#print "faculty" after the update:
for x in mycol.find():
print(x)
#Deleting records
deldata = { "address": "Tirunelveli" }
mycol.delete_one(deldata)
#print "faculty" after the delete:
for x in mycol.find():
print(x)
```

```
#Output for inserting and finding records
{'_id': 7, 'name': 'Lakshmi Mahesh', 'address': 'Ernakulam'}
{'_id': 10, 'name': 'Vidya Gopinath', 'address': 'Ernakulam'}
{'_id': 13, 'name': 'Anitha G Krishnan', 'address':
'Ernakulam'}
{'_id': 14, 'name': 'Arun Krishnan', 'address': 'Ernakulam'}
{'_id': 16, 'name': 'Arsha P B', 'address': 'Ernakulam'}
{'_id': 18, 'name': 'Rose Paul', 'address': 'Ernakulam'}
```

```
#Output for updating records
{'_id': 1, 'name': 'Mariadas Ronnie C P', 'address': 'Fort
Kochi'}
{'_id': 2, 'name': 'Ranjith S', 'address': 'Chottanikkara'}
{'_id': 3, 'name': 'Sudha D', 'address': 'Aluva'}
{'_id': 4, 'name': 'Anjana S Chandran', 'address':
'Palarivattom'}
{'_id': 5, 'name': 'Praveen Kamath', 'address': 'Thammanam'}
{'_id': 6, 'name': 'Jisha Liju Daniel', 'address': 'Kakkanad'}
{'_id': 7, 'name': 'Lakshmi Mahesh', 'address': 'Ernakulam'}
{'_id': 8, 'name': 'Jismy Joseph', 'address': 'Perumbavoor'}
{'_id': 9, 'name': 'Shoby Sunny', 'address': 'Kakkanad'}
{'_id': 10, 'name': 'Vidya Gopinath', 'address': 'Ernakulam'}
{'_id': 11, 'name': 'Remya Raveendran', 'address': 'Kaladi'}
{'_id': 12, 'name': 'Bindu John', 'address': 'Mala'}
{'_id': 13, 'name': 'Anitha G Krishnan', 'address':
'Ernakulam'}
{'_id': 14, 'name': 'Arun Krishnan', 'address': 'Ernakulam'}
{'_id': 15, 'name': 'Sujith', 'address': 'Edakochi'}
{'_id': 16, 'name': 'Arsha P B', 'address': 'Ernakulam'}
{'_id': 17, 'name': 'Satheesh', 'address': 'Pambakuda'}
{'_id': 18, 'name': 'Rose Paul', 'address': 'Ernakulam'}
{'_id': 19, 'name': 'Binu V S', 'address': 'Trivandrum'}
{'_id': 20, 'name': 'Vignesh Karthik', 'address': 'Tirunelveli'}
```

```
#Output for deleting records
{'_id': 1, 'name': 'Mariadas Ronnie C P', 'address': 'Fort
Kochi'}
{'_id': 2, 'name': 'Ranjith S', 'address': 'Chottanikkara'}
{'_id': 3, 'name': 'Sudha D', 'address': 'Aluva'}
{'_id': 4, 'name': 'Anjana S Chandran', 'address':
'Palarivattom'}
{'_id': 5, 'name': 'Praveen Kamath', 'address': 'Thammanam'}
{'_id': 6, 'name': 'Jisha Liju Daniel', 'address': 'Kakkanad'}
{'_id': 7, 'name': 'Lakshmi Mahesh', 'address': 'Ernakulam'}
{'_id': 8, 'name': 'Jismy Joseph', 'address': 'Perumbavoor'}
{'_id': 9, 'name': 'Shoby Sunny', 'address': 'Kakkanad'}
{'_id': 10, 'name': 'Vidya Gopinath', 'address': 'Ernakulam'}
{'_id': 11, 'name': 'Remya Raveendran', 'address': 'Kaladi'}
{'_id': 12, 'name': 'Bindu John', 'address': 'Mala'}
```

{'_id': 13, 'name': 'Anitha G Krishnan', 'address': 'Ernakulam'}
{'_id': 14, 'name': 'Arun Krishnan', 'address': 'Ernakulam'}
{'_id': 15, 'name': 'Sujith', 'address': 'Edakochi'}
{'_id': 16, 'name': 'Arsha P B', 'address': 'Ernakulam'}
{'_id': 17, 'name': 'Satheesh', 'address': 'Pambakuda'}
{'_id': 18, 'name': 'Rose Paul', 'address': 'Ernakulam'}
{'_id': 19, 'name': 'Binu V S', 'address': 'Trivandrum'}

Applications of Data science

1. *Fraud and risk detection*

We are witnessing the larger amount in the quantity of data, both at global and economic level entities where the data can be audio, video, text, pictures etc. Thus, we are in a need to implement the data analytics software to prevent and detect fraud. Data are available from various sources like call centers, social media, phone, email, fax etc. We need to use these data for making strategy decisions, detect and prevent fraud etc. The usage of data analysis software provides in-depth analysis of the phenomena of fraud and corruption since information and communication technology has become an instrument of the economy.

There are a variety of tools available in the market for supporting anti-fraud activities. An example is Forensic Data Analytics (FDA) tools. An example of these tools are Microsoft Excel, M S Access and SQL Server. Even though they are important FDA tools, they are focused to be used primarily on matching, grouping, ordering, joining or filtering data. To improve the data analytics process for preventing and detecting fraud data is to provide an in-depth examination of the meaning and features of the data using some specific methods and techniques. These techniques make careful examination of the data and identifies its strength, weakness, dysfunction, vulnerability and other risk factors which may constitute threats and finally suggest guidelines for removing threats.

There are different types of data analysis. The difference depends on the nature of data, practical usability and applicability, scope etc. The two classical types of analysis are namely *operational analysis* and *strategic analysis [1]*. Operational analysis is used to exploit data and present information to comply with currently running activities in order to detect fraud thereby providing maximum efficiency. The role of operational analysis is to detect and defend illegal activities such as examination of links and their characteristics, the movement of money and other variables, communication through email, social networking etc. The strategic analysis on the other hand, offers a macro view of fraud. Digital statistical tools are used to explore data and its variations. It has a powerful interface and a statistical processing engine. In the early days, statistics and exploration of data were developed independently of the visual techniques. With the usage of new generation software, we could access large data sets and could find patterns and threats within a short span of time which would take hours or days in conventional data mining process.

Visual analysis is an important technique to understand the location in which the fraud has happened and discover the patterns based on fraud behaviors. Analytical tools are used to identify, explore, index and process data. The challenge is about how to implement automated methods and tools in order to detect and prevent fraud and to make decisions. The system should be capable in such a way that it should be able to retrieve data from different sources of different formats. Even though the data is in different formats, they should be still treated using the same methods so that the database creation would be homogeneous. The actual mode of fraud detection is the combination of human and technical support. Human intervention brings the exploitation of results no matter how the technologies have been improved.

The integration of data analytics with the fraud detection system brings out certain benefits and limitations. The benefits are such that answers would be obtained in real time to a series of questions regarding fraud issues. The other benefits are faster access to data, elimination of duplicate records, high productivity, increased rate of fraud detection, fast detection and recovery from fraud activity, statistical analysis with greater accuracy, reducing claims related to fraudulency, improving the analytical product quality. The limitation is such that the analytical tools used are not cheap. The other limitations are, not all the data are available in databases and the usage of analytical tools does not save your time.

2. Healthcare

Medical imaging is one of the applications in image processing. The scanned images of patients are used in data science to find the patients defects and to decide which treatment should be suggested for patients in order to recover from the disease. The usage of deep learning algorithms [2] helps to determine the difference in resolution, dimension between medical images obtained from x-ray etc. The proper analyzation of these images helps doctors to make proper decision on which treatment could be given for patients, improving medical accuracy, accurately detect various diseases etc.

An important application of data science in health care is drug discovery. To find a new drug, it requires a number of procedures and tests and it would take lot of time and resources. By the usage of data analysis, it would be able to perform millions of calculations within a minimum amount of time and resources. By analyzing data and by using various algorithms, it is now possible to detect the effect of the drug in human body and its probability of success. Data such as the patient’s response to the drug and its side effects are analyzed and is used to improve the efficiency of the drug. Due to these advantages, a drug could be released within a minimum span of time.

Predictive analytics is used in healthcare to develop plans to decide the most effective treatment for the patient. By using predictive analytical tools, doctors could diagnose disease in a patient at an earlier level. So, it helps the doctors to suggest patients about the various prevention measures that is needed to be taken if diseases are identified at an earlier stage.

Another application of data science in healthcare is to provide virtual assistance. There are certain applications in data science that would predict the type of disease depending on the inputs provided by the patients as symptoms of the disease. Other type of applications would notify the patients on a daily basis about the medical intake they should follow for avoiding the skipping of medicinal intakes.

3. IoT

Data are generated as huge amount from IoT devices such as sensors, satellites, RFID's, actuators, consumer appliances, social media etc. The data generated from sensors and objects are transferred through networks and are stored in the cloud for big data processing. Applications that support data science are used by scientists to analyze structured and unstructured data generated from IoT devices. These applications extract information to identify trends, patterns and make effective decisions. The IoT data is mostly collected from sensors. So, regarding external influences such as noise, heterogeneity, these data will be different from normal big data.

Smart devices that use data and connectivity are integrated with each other and the IoT integrates these collected data from the devices through intelligence applications. The integrated data produce a huge amount of data so that data science could play an important role in IoT for pattern recognition, decision making etc.

An example of business analytics technologies that are integrated with IoT devices are wearable health monitoring sensors. The health data collected through sensors report the change in the normal activities of its members so that healthcare professionals could collect the data and analyze, monitor their patients efficiently. Another example is by monitoring the environment conditions, the level of energy consumption and the performance of equipment. Thus, it requires IoT to collect the data and data science to extract useful information and thereby monitoring the performance and changes of the object. An example of IoT monitoring and control systems is Smart Home Technology [3] which is used to save energy and to protect family and property. In terms of protecting family and property, users can control the IoT system using their smartphone or laptop. They could adjust the lights, control locking and unlocking of doors and could also manage the security systems. Another application is the usage of IoT in smart cars where the various parts of the car could be controlled and monitored.

4. Targeted Advertising

Customer prospecting [4] is a challenging segment of the online display advertising market. It deals with the delivery of advertisements to customers who have no previous interactions with any particular brand, but likely to become customers of that particular brand when a proper advertisement has been shown. Real time bidding exchanges normally auction off web sites for placing online display ads on it through which a customer using a website gets interested in. Thus, through website auctions, advertisers could target customers through their ads. Auctions are done in real time when the customer navigates through the browser. At the time of the auction, the advertiser could decide whether to bid for the space on the website, how much bidding for the space should be done and what to put as ad, if the advertiser wins the auction. The ad would be put by the advertiser depending on the previously collected data depending upon the consumer and the website. Real time auction happens in websites in billions and advertisers would require large scale data to come to a decision within a short span of time. Thus, machine learning comes in optimizing ads because of the massive amount of data based on consumer behavior, data based on the actions of consumers related to brand behavior and based on the ability to make advertising decisions and delivering advertisements in real time.

5. Website recommendations

Recommendation systems are an important component in the tourism industry. The most important components are online booking and reservation systems. Recommendation systems are used by tourists in order to find the best place for stay when they tour a place. The system would provide tourists with a list of hotels out of which the users could choose some. The data that would be collected by the recommendation systems would get limited if it collects data from homogeneous systems. As the data collected could be residing in heterogeneous systems too, collecting data from them would lead to complexity. Thus, developers should deal with the heterogeneity of the data collected from different types of sources. The recommendation systems should be able to recommend a hotel or list of hotels to users based on numerical and textual data by means of machine learning to achieve accurate recommendations. It should be able to mine user reviews from other travelers by means of ranks/votes made by them and thus obtaining an accuracy in recommendation. An efficient big data solution is by means of using Hadoop since it deals with data heterogeneity.

Since sentimental analysis [5] is the process of extracting opinions from reviews, it is used by many online recommendation systems to make travelers rate hotels based on location, rooms, cleanliness, service, staff and safety. Along with sentimental analysis, machine learning is used to categorize the reviews based on positive, negative and neutral values. Afterwards, training dataset is used to train and validate the performance.

There are two types of datasets namely training dataset and test dataset. The classification factors are learned from the training dataset and the classification accuracy is evaluated based on the test dataset. Another approach is by using the cluster-based approach along with collaborative filtering thereby reducing the computation time. Since the available web data are enormous, the problem that should be tackled is how to manage this data and how to improve time efficiency and performance. The solution is by using Hadoop and NoSQL which efficiently handles the time efficiency and performance when dealing with these huge amounts of data.

6. Advanced Image Recognition

Image processing plays a vital role in various organizations, industries, healthcare, defense etc. It means that an image will be analyzed as input and afterwards, image processing techniques will be applied to that image to obtain an output which can be a different form of the image or the part of an image. The resultant image produced by image processing techniques could be huge resulting the categorization of big data. The huge amount of information is stored as structured or unstructured data. Big data analytics for data mining on the data formed through image processing has a profound application in the field of education, research, govt. organizations, healthcare, defense, business etc. Visualization techniques [6] are used for message communication in the form of image, animation or video. There are different visualization techniques such as abstract visualization and scientific visualization. Images can be subject to noise. Many algorithms could be used for de-noising an image. To overcome resolution loss, image restoration techniques are used. For example, Adobe Photoshop as a software is used for this purpose. Image retrieval is the process of retrieving images from a huge database system. The different techniques of retrieving images are content based, document-based image retrieval. Algorithms are mainly used for feature extraction, smoothing, reconstruction and enhancing the quality of images. In future, image and big data may be combined into a hybrid system. Research could be done in detecting satellite images, detect health care problems such as tumor, problems related to diseases in fruits or vegetables which may of big help for farmers.

III. Conclusion

As companies need data for their data driven decision models, the companies will focus on specific areas such as marketing, customer acquisition, innovation to improve customer experience. Data Scientists are the backbone of the huge amount of data processing companies or organizations. Data scientists provide the essential data that the companies need. The purpose of each Data Scientist is to extract, preprocess and analyze data for the companies. Through this, the companies could be able to make better decisions. Various companies have their own requirements and use data accordingly. Thus, the goal of the Data Scientist is to make businesses grow better. With the decisions and insights provided, the companies would be able to adopt appropriate strategies and customize themselves for enhanced customer experience. Thus, this paper was providing an insight of about how the data science applications produce patterns of data from huge amount of csv, excel, json, mongodb data to produce patterns of data.

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ATMA-NIRBHAR BHARAT ABHIYAAN' IN THE CONTEXT OF GLOBAL MARKETING

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Abstract: **:** On 12 May, 2020, the Honourable Prime Minister of India, Shri Narendra Modi announced in his address to the nation an economic package of Rs. 20 trillion to tide over the Coronavirus crisis under the Atma-Nirbhar Bharat Abhiyaan. Complementing this view point of the nation, the Honourable Finance Minister of Govt. of India Smt. Nirmala Sitaraman in her budget presentation speech announced Rs. 35,000 crore for the development of Covid-19 vaccines. Even though one can find out certain controversies around the Atma-Nirbhar Bharat Mission, the current scenario warrants for more thought-provoking intrusions into the subject. The present paper details the intricacies of the Atma-Nirbhar Bharat Abhiyan and relates it to the global marketing scenario.

Index Terms - Abhiyaan,MSME,PPP

I. INTRODUCTION

The headlines of a very recent newspaper in early July 2020 report goes like this: "Atma-Nirbhar Bharat Abhiyaan: Not about closing doors, but greater global engagement, says Piyush Goyal". The report continues, "Borrowing from Prime Minister Narendra Modi's five 'Is' — intent, inclusion, investment, infrastructure and innovation – Piyus Goyal, Union Minister for Commerce & Industry and Railways, Government of India said India should focus on investment, infrastructure and innovation in the post-Covid world". According to him most countries across the world have succeeded on the back of new technology, engagement with newer ways of doing work and innovating not only in products and services but also their processes. 'Atma-Nirbhar Bharat Abhiyaan' was not about closing India's doors but opening them and having a greater global engagement. Emphasising that self-reliance does not entail cutting ties with rest of the world, it actually meant a larger role for Indian entrepreneurs, businesses, youngsters and all stakeholders to become a part of resilient global supply chains. "It is about improving our quality of production, achieving higher economies of scale, greater production capacities so that we not only meet India's needs but also meet global demand at competitive prices and through quality products," the Minister said addressing the officials of Bombay Chamber of Commerce and Industry (BCCI) at its 184th Annual General Meeting".

Newspapers of 9 January, 2021 also carry the following headlines: "Atma-Nirbhar Bharat Abhiyaan will make world order more just and fair: Kovind". The report continues: "Ram Nath Kovind, Honourable President of India, said the development of two vaccines for Covid-19 in India is a major step for Aatma-Nirbhar Bharat (Self-reliant India) which runs on the spirit of global well-being. The recent success of our scientists and technicians in developing two Covid vaccines is a major achievement for the Aatma-Nirbhar Bharat Abhiyaan which is driven by the spirit of global well-being," the President said, delivering the Valedictory Keynote address of Pravasi Bhartiya Divas Convention, 2021. The Drugs Controller General of India (DCGI) has approved two vaccines, 'Covishield' from Oxford and Serum Institute of India (SII) and 'Covaxin', an indigenous vaccine developed by Bharat Biotech. He said that year 2020 has been the year of a global crisis caused by Covid-19 and India has been at the forefront in forging a global response to combat the enormous challenges posed by the pandemic. We supplied medicines to nearly 150 countries, making the world look at India as the 'pharmacy of the world'," he added. He said that the Indian government intends to mitigate any disruptions in global supply chains by enhancing availability of goods and services. The idea of Aatma-Nirbhar Bharat is about self-belief leading to self-sufficiency but not seeking self-centered arrangements or turning the country inwards. "Our vision of Aatma-Nirbhar Bharat Abhiyaan has five key pillars of economy, infrastructure, demography, democracy and supply chains".

Obviously these two reports achieve significance in the context of opinion expressed by Shri Amitabh Kant, IAS, CEO, NITI Aayog, Govt. of India. Shri Kant opined that Innovation is the key to success for economic growth and Atma-Nirbhar Bharat Abhiyaan is not anti-globalisation. Sharing his thoughts at FICCI Frames he said that India is in the midst of transformation and people who work with the technology and sunrise sectors will survive going ahead. The country needs to leapfrog into the world of technology. India very often gets into sunset areas of industries and then it becomes very difficult to penetrate in the global market. Therefore, it is very important for the country to get into new areas of growth. He highlighted that people who are going to work on data and artificial intelligence will drive growth going ahead. India's usage of data will be enormous. There is a need to move from data to data intelligent, according to him. The use of block chain is the need of the hour. The technology will also help in real-time monitoring of specific issues. India needs to liberalise on clinical trials and there is a need to get into high-value products. Atma-Nirbhar Bharat Abhiyaan programme has brought many reforms in the form of MSME definition, agricultural sector, among others. Atma-Nirbhar Bharat is not anti-globalisation. It is about getting the best from the world. It is not about protectionism. It is about enhancing the ability of Indian companies to create world-class products and capture the domestic market and then use the strength of the domestic market to penetrate into the global market. It is about being a global champion.

Complementing this view point of the nation, the Honourable Finance Minister of Govt. of India Smt. Nirmala Sitaraman in her budget presentation speech announced Rs. 35,000 crore for the development of Covid-19 vaccines. This is the most important pillar of the vision for Atma-Nirbhar and Swachh Bharat and while the economy is still struggling with the consequences of Covid-19, budgetary support for vaccination and healthcare assumes utmost importance. The government will be focussing on three areas *viz*. preventive health, curative health and well-being. The financial support will overcome fears and boost the service sector for full recovery. As vaccination progresses, hospitality, tourism and formal retail sectors will resume their normal pace.

In the budget speech, the Finance Minister said that the National Infrastructure Pipeline (NIP) launched in December, 2019 with 6,835 projects, has now been expanded to 7,400 projects and around 217 projects worth Rs. 1.10 lakh crore under some key infrastructure ministries have been completed. The budget proposes significant enhancement of capital expenditure to the tune of Rs. 5.54 lakh crore in the next fiscal, besides creating institutional structures and giving a big thrust to monetizing assets to achieve the goals of NIP. NIP is a specific target which the government is committed to achieving over the coming years, which requires a major increase in funding both from the government and the financial sector.

Atma-Nirbhar Bharat Mission

Atma-Nirbhar means 'Self-reliant'. On 12 May, 2020, the Honourable Prime Minister of India, Shri Narendra Modi announced in his address to the nation an economic package of Rs. 20 trillion to tide over the Coronavirus crisis under the Atma-Nirbhar Bharat Abhiyaan. He said the economic package would play an important role in making India 'self-reliant' and that it would benefit labourers, farmers, honest tax payers, MSMEs and the cottage industry. Making the country self-reliant is the only way to make 21st century belong to India. According to the government, it is not protectionist in nature. The economic crisis triggered by the Coronavirus pandemic in 2020 gave birth to the Atma-Nirbhar Bharat Abhiyaan. While the idea was first proposed by the Prime Minister, some of its features are similar to the Swadeshi Movement launched on 7 August, 1905, to take on the British regime of the time.

The five pillars on which Atma-Nirbhar Bharat is to be based are: 1). Economy, 2). Infrastructure, 3). Technology driven system, 4). Vibrant demography, and 5). Demand. According to the government, self-reliance does not advocate a self-centered protectionist system. According to the Honourable Prime Minister of India, Shri Narendra Modi, Atma-Nirbhar Bharat spirit pervades every day from cricket to Covid fight. "It is not only about technological advancement and progress. It has become part of everyday life of the nation," he said, addressing the 18th Convocation of Tezpur University digitally from New Delhi on 21 January, 2021. In this context, he referred to the miraculous victory of the young Indian cricket team in Australia which overcame multiple challenges to win the Test match series. "They faced the challenges boldly and came up with new solutions despite a string of injuries and lack of experience. A positive mind-set always leads to positive results which is the essence of Atma-Nirbhar Bharat".

Summary of announcements under Atma-Nirbhar Bharat Abhiyaan

On 12 May, 2020, the Prime Minister of India, Shri Narendra Modi, announced a special economic package of Rs. 20 lakh crore (equivalent to 10% of India's GDP) with the aim of making the country independent against the tough competition in the global supply chain and to help in empowering the poor, labourers, and migrants who have been adversely affected by Covid-19. Following this announcement, the Finance Minister, Smt. Nirmala Sitharaman, through five press conferences, announced the detailed measures under the economic package. Following is a summary of the key measures proposed under the economic package:

Government Reforms: Policy Highlights

- Increase in borrowing limits
- Privatisation of Public Sector Enterprise (PSEs)

Measures for businesses (including MSMEs)

Financial Highlights

- Collateral free loans for businesses
- Corpus for MSMEs
- Subordinate debt for MSMEs
- Schemes for NBFCs
- Employee Provident Fund (EPF)
- Statutory PF contribution
- Street vendors

Policy Highlights

- Expediting payment of dues to MSMEs
- Insolvency resolution
- Disallowing global tenders
- Reduction in TDS and TCS rates
- Ease of doing business for corporates

Legislative Highlights

- Definition of MSME
- Initiation of insolvency proceedings
- Amendments to Companies Act, 2013

Agriculture and Allied sectors

Financial Highlights

- Concessional Credit Boost to farmers
- Agri Infrastructure Fund
- Emergency working capital for farmers
- Support to fishermen
- Animal Husbandry infrastructure development
- Employment push using CAMPA (Compensatory Afforestation Management and Planning Authority) funds

Legislative Highlights

- Amendments to the Essential Commodities Act
- Agriculture marketing reforms
- Agriculture Produce Pricing and Quality Assurance

Migrant Workers: Policy Highlights

- One Nation One Card
- Free food grain supply to migrants
- Affordable Rental Housing Complexes (ARHC) for migrant workers / urban poor

Civil Aviation: Policy Highlights

- Efficient airspace management
- Public Private Partnership (PPP) model for airports

Defence: Policy Highlights

- Increase in FDI limit in defence manufacturing under automatic route
- Make in India initiative in the defence sector

Energy: Financial Highlights

- Liquidity support for distribution companies (Discoms)
- Coal evacuation

Policy Highlights

- Safeguarding consumer rights
- Regulatory assets
- Privatisation of power distribution
- Commercial coal mining

Legislative Highlights

- Reduction in cross-subsidy

Housing: Financial Highlights

- Credit Linked Subsidy Scheme for Middle Income Group (MIG)

Policy Highlights

- Support to real estate sector

Social Sector: Policy Highlights

- Public health
- Allocation for MGNREGS
- Viability Gap Funding
- Technology driven education

Key measures taken by Reserve Bank of India (RBI)

The overall financial package that has been announced also includes the liquidity generated by measures announced by RBI. Some of these measures include:

- Cash Reserve Ratio (CRR) was reduced which resulted in liquidity support of Rs. 1,37,000 crore.
- Banks' limits for borrowing under the marginal standing facility (MSF) were increased. This allowed banks to avail additional Rs. 1,37,000 crore of liquidity at reduced MSF rate.
- Total Rs. 1,50,050 crore of Targeted Long Term Repo Operations (TLTRO) has been planned for investment in investment grade bonds, commercial paper, non-convertible debentures including those of NBFCs and MFIs.
- Special Liquidity Facility (SLF) of Rs. 50,000 crore was announced for mutual funds to provide liquidity support.
- Special refinance facilities worth Rs. 50,000 crore were announced for NABARD, SIDBI and NHB at policy repo rate.
- A moratorium of three months has been provided on payment of instalments and interest on working capital facilities for all types of loans.

Controversy around Atma-Nirbhar Bharat Mission

The government has said 'self-reliant India does not mean cutting off from rest of the world.' However, some have called Atma-Nirbhar Bharat as a re-packaged version of the Make in India drive using new taglines such as 'Vocal for Local'. Some are of the opinion that Atma-Nirbhar Bharat is not even new – it resonates well with erstwhile ideologies and campaigns (political, business, social or otherwise) such as 'Swaraj', 'Swadeshi', 'The Green Revolution', 'The White Revolution', 'Import Substitution', and also innumerable campaigns of Indian organizations such as Patanjali. Some Opposition members have spoken about how India had enacted policies and built companies since its creation to make India self-reliant - SAIL for steel production, IITs for domestic engineers, AIIMS for medical sciences, DRDO for defence research, HAL for aviation, ISRO for space, CCL, NTPC and GAIL in the area of energy, for example. These politicians have criticised the so-called advertising tactics in the re-packaged scheme. Some have also panned the scheme re-phrased as "Fend For Yourself" Campaign.

Time to think about global marketing and Atma-Nirbhar Bharat

Global marketing can be defined as marketing on a world-wide scale reconciling or taking global operational differences, similarities and opportunities in order to reach global objectives". Global marketing is also a field of study in general business management that markets products, solutions and services to customers locally, nationally, and internationally. International marketing is the application of marketing principles in more than one country, by companies overseas or across national borders. It is done through the export of a company's product into another location or entry through a joint venture with another firm within the country, or foreign direct investment into the country. International marketing is required for the development of the marketing mix for the country. International marketing includes the use of existing marketing strategies, mix and tools for export, relationship strategies such as localization, local product offerings, pricing, production and distribution with customized promotions, offers, website, social media and leadership. Internationalization and international marketing is when the value of the company is exported and there is inter-firm and firm learning, optimization, and efficiency in economies of scale and scope. International marketing is the performance of business activities that direct the flow of goods and services to consumers and users in more than one nation. It is the application of marketing principles to satisfy the varied needs and wants of different peoples residing across the national borders. It is also the application of marketing principles by industries in one or more than one country. The international promotion policy is another key factor in the global market. Besides deciding a global or local promotion, the type of promotion that we should carry out will be related to the distribution systems available in the foreign markets. International branding is a process of designing a distinct name and picture for an item in the minds of the customers, mainly through advertising campaigns.

Global marketing relies on firms that understands the requirements associated with servicing customers locally with global standard solutions or products and localizes that product as to maintain an optimal balance of cost, efficiency, customization and localization in a control-customization continuum to meet local, national and global requirements. Global marketing and global branding are integrated. Branding is a structured process of analyzing "soft" assets and "hard" assets of a firm's resources. The strategic analysis and development of a brand includes customer analysis (trends, motivation, unmet needs, segmentation), competitive analysis (brand image/brand identity strengths, strategies, vulnerabilities), and self-analysis (existing brand image, brand heritage, strengths/capabilities, organizational values). Global brand identity development is the process of establishing brands of products, the firm, and services locally and world-wide with consideration for scope, product attributes, quality, uses, users and country of origin; organizational attributes; personality attributes, and brand-customer relationship; and important symbols, trademarks metaphors, imagery, mood, photography and the company's brand heritage. A global marketing and branding implementation system distributes marketing assets, affiliate programs and materials, internal communications, newsletters, investor materials, event promotions and trade shows to deliver integrated, comprehensive and focused communication, access and value to the customers.

Now let us come to the point. What does this renewed interest in 'Atmanirbharta' (self-reliance) mean for marketers and campaign managers working for/with home-grown organisations? First and foremost, marketers and campaign managers need to accept the resurgence of nationalist fervour propelled by the Covid-19 crisis, especially its place of origin. The changes introduced in the economy and functioning of businesses are here to stay and so is the renewed interest in all things home-grown. Marketers and campaign managers need to quickly adapt to the new normal. Second, as social distancing measures will now be the norm, marketers and campaign managers need to be more self-reliant in designing and executing marketing campaigns. Physically meeting and discussing your campaign plans with your research and advertisement agencies and overseeing the executions of the campaigns will not be a regular affair. Hence, developing and executing such campaigns will require the marketer to do a lot of background work before engaging agencies to run the campaigns. Third, marketers who still haven't had the chance to join the digital marketing bandwagon now is the right time. In fact, this is the last chance for them. Fourth, marketers and campaign managers need to have more local content to recapture the imagination of the Indian public. To develop more locally-grounded content, marketers and campaign managers need to work with Indian aesthetics (in place of western concepts and constructs), culture, and traditions. In other words, now is the time to look inwards into our 'atman' (soul) i.e., into our glorious history, culture,and traditions.

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Fabrication of a Flat Plate Photovoltaic Thermal Collector

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Abstract- A PV/T system is a hybrid system with a solar photovoltaic panel anda solar thermal collector that generate electrical and thermal energy simultaneously. The paper describes the fabrication of an Unglazed Flat Plate Collector system and experimentation of a Photo Voltaic/Thermal (PV/T) hybrid system.The photovoltaic/thermal (PVT) concept offers an opportunity to increase the overall efficiency of a PV module through the use of the waste heat generated in the PV module and subsequently cools the PV module.

Keywords – PV/T, Solar, Absorber, PUF

I. INTRODUCTION

The photovoltaic-thermal hybrid solar collector (or PV/T) is an equipment that integrates a photovoltaic (PV) module, for the conversion of solar energy into electrical energy, and a module with high thermal conversion efficiency, which employs a thermal fluid [1]. Most of the incoming solar energy is either reflected or absorbed as heat energy. Consequently, the working temperature of the solar cells increases considerably after prolonged operations and thereafter the cell's efficiency drops significantly. Unglazed collectors increases the electrical efficiency of the solar panel since the glazing is absent and thus reducing convective heat losses [2].Flat plate collectors are easy to manufacture and require low maintenance [3]. Flat plate collectors collect heat from both types of radiation-beam and diffuse.PV/T system is a type of co-generation system that produces power and heat from a single system by absorbing the waste heat from a solar panel [4].

When properly designed, PV/T systems can extract heat from PV modules, heating water or air to reduce the operating temperature of the PV modules and keep the electrical efficiency at a sufficient level [5]. A very recent example in this regard is studied where the performance assessment and comparison of two cascaded solar-assisted process heating systems have been presented,photovoltaic thermal (PVT) cascaded with flat-plate collector (PVT-FPC) and PVT coupled with heat pipe evacuated tube collector [6]. Solar thermal systems and solar PV systems have each advanced markedly, and combining the two technologies provides the opportunity for increased efficiency and expanded utilization of solar energy [7]. The current paper explains the fabrication of a flat plate photovoltaic thermal collector.

II. DESIGN AND FABRICATION OF THE SYSTEM

The fabrication of the system combines two technologies; a solar photo voltaic panel and a solar thermal collector that generate electrical and thermal energy simultaneously. The thermal collector made of rectangular copper pipes is configured as a Parallel-tube Flat-plate collector and is mounted to the reverse of a Poly crystalline PV panel. The collector pipes of rectangular shape helps in increasing the contact area between the pipes and PV panel, thus increasing the heat transfer. Each collector pipe is covered by insulation tape to reduce heat lose (Fig. 1). The PV/T collector, typically consists of a PV module on the back of which an absorber plate (a heat extraction device) is attached. PV modules convert solar radiation into electricity with peak efficiencies in the range of 5–20% [8]. The purpose of the absorber plate is two-fold. Firstly, to cool the PV module and thus to improve its electrical performance and secondly to collect the thermal energy produced, which would have otherwise been lost as heat to the environment. This collected

heat could be used, for low temperature applications such as domestic hot water production for showers and washing. Normally the electrical and the thermal performance of PV/T collectors is lower than that of separate PV panels and conventional thermal alone [9]. The photo voltaic thermal system consist of the combined flat plate collector and solar panel connected *via.* mechanical bonding. The specifications of the entire system is given in Table 1.

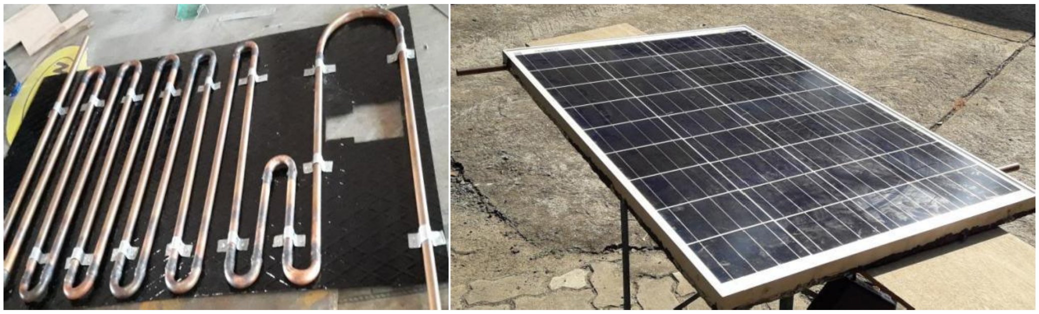


Figure 1. Collector pipes and solar panel

Table - 1 FPC-Flat Plate Collector specifications

Details	**Dimensions**
Length of absorber plate	103 cm
Width of absorber plate	63 cm
Thermal conductivity of plate material	210 W/mK
Absorber plate thickness	2 mm
Insulation material	Glass wool
Heating pipes specifications	0.625 cm dia., 6m length
Length of individual pipes	52.5 cm
Spacing between pipes	4 cm
Thickness of pipes	2 mm
U bend	0.625 cm dia.
Copper pipes loops	7 nos.
Total number of pipes	15
Insulation	PU Foam insulation
Adhesive	Epoxy aluminium paste
Thickness of adhesive	2 mm
Casing material	Aluminium
Dimensions of the casing	107 cm ×67 cm

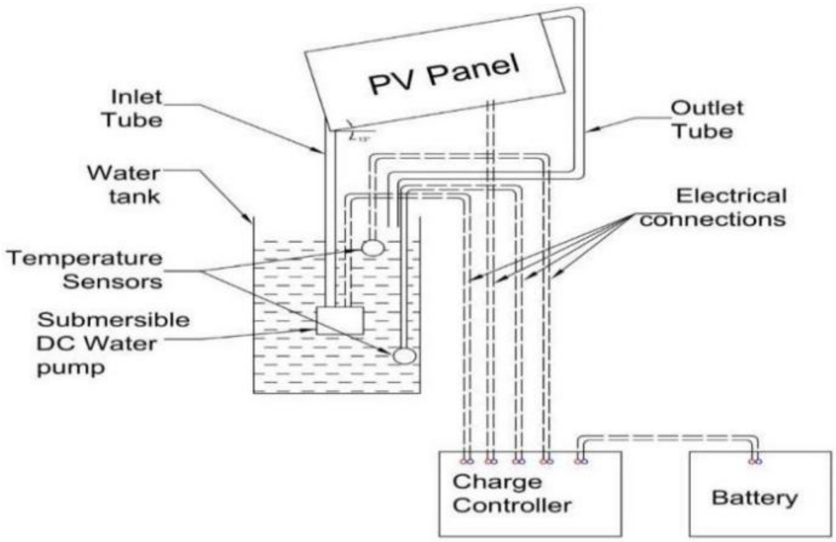
2.1 *Fabrication procedure-*

The aluminium sheet is cut based on the solar panel surface area and based on the positions where electrical connections are to be given. Both sides of the aluminium sheet are painted with black paint to increase absorptivity. Copper pipes are sized based on the length of the absorber plate and brazed with a U bend. They are then riveted to the aluminium sheet**.** The photo voltaic panel is connected to the absorber plate with the help of integration methods.

2.2 *Integration methods-*

Thermally conductive adhesives are the most widely used method in integration of PVlayer with the thermal absorber for all kinds of PV/T modules. Thermal characteristics include high thermal conductivity, extreme operating temperature range and good elongation properties, which improves the overall efficiency of the PV/T module greatly. This thermal adhesive integration method is a simple and cost effective one. In the present studies aluminium epoxy paste is used as adhesive. Epoxy adhesive is applied to fix the aluminium

sheet to the reverse side of the solar panel. Adhesive 'M-seal' is applied to the joints to prevent leakage of water. The entire system is closed and sealed with aluminium sheet (made in the form of an external casing). The PUF insulation is poured through the holes drilled in the casing and solid insulation is formed between the pipes.



2.3 *PV/T system and accessories-*

The systems comprises of storage tanks and temperature sensors, flexible hose (Figure 2). The water is stored in a tank connected to a DC pump in order to circulate the water. The temperature sensors are used to measure the temperature of the PV Panel, outlet hot water temperature and inlet cold water temperature.

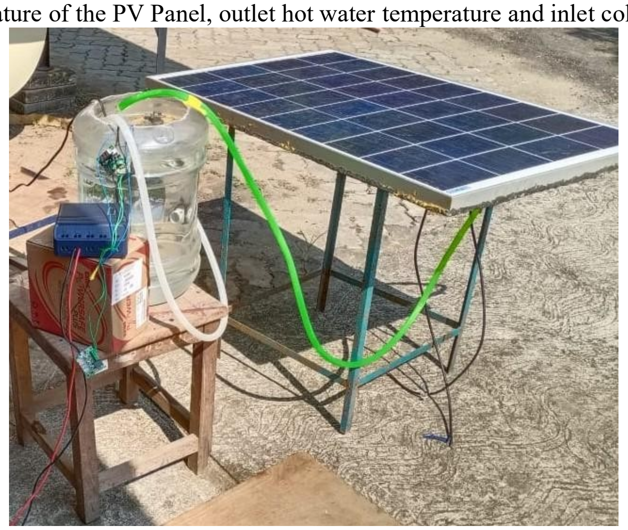


Figure 2. Fabricated PV/T system

2.4 *Specifications of the system-*

Solar Panel - Luminous Polycrystalline, Maximum power = 100 W, Open circuit voltage 22V, Short circuit current 6.06 A, Battery Luminous 110 Ah, Charge controller 6 A, 12 V.

2.5 *Material Selection Parameters-*

Absorber plate: Aluminium (High thermal conductivity, Light weight), Heating pipes: Copper pipes (Good heat transfer), Pipe bends (U bends), Black paint (To increase solar absorptivity), Insulation - PUF foam (High insulation capacity, good thickness, less air leakage), Casing - Aluminium (Less corrosive property).

III. EXPERIMENT AND RESULT

Photovoltaic technology is one of the finest ways to harness the solar power [10]. Photo voltaic thermal systems are co-generation systems that extract waste heat from the PV system. A PV/T system is a hybrid system with a solar photovoltaic panel and a solar thermal collector that generate electrical and thermal energy simultaneously. A review of literature suggests that most of the earlier research goals were twofold, that is to enhance the efficiency of the solar PV systems and to ensure a longer life at the same time [11]. Initially the PV system is tested for many days and it was found from the experimental values that as the open circuit voltage reduces at noon time and short circuit current increases at noon time since the temperature reduces and consequently the efficiency of the system reduces. In the present studies the fabrication of an unglazed Flat Plate Collector system was done for further experimentation of a Photo Voltaic/Thermal (PV/T) hybrid system. The future applications of photo voltaic technology will utilize the system technology available today and sub-system technology advances can be accommodated through minorsystem changes [12].

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The Impact of Covid-19 on Construction and Engineering Sectors in India and Elsewhere

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Abstract: The Covid-19 pandemic has devastated the world of work. Its impact, which varies across sectors, has been significant in the construction sector also. The construction and the engineering sectors were the ones that had to bear the worst brunt of Covid-19, as it was already battling a liquidity crunch as fallout of the non-banking financial institutions in the financial sector since the beginning of 2020. This article analyses the Covid-19 pandemic situation and its effect on construction and engineering sectors in Indian and elsewhere. it is essential to have a thorough rebuilding plan after an analysis of all the risks by each player in their respective universes and a proper execution of the Concrete measures for reviving the construction sector includes ensuring safety of informal labourers, increased remuneration to skilled work force, reduction of interest rates.

Keywords — Construction, Corona virus, Covid-19, Engineering, Financial sector, Liquidity crunch

I. INTRODUCTION

The world today stands under the recovery phase from the severe attack of the Coronavirus or the Covid-19 pandemic. Almost every commercial activity is suffering at the hands of the ruthless Covid-19. The hardest affected sector, the construction and engineering sector is definitely on the wrong end of the curve. (Kohli and Chadha (2020). The COVID-19 pandemic has devastated the world of work. An article by Sigahi *et al.* (2021) presents a systematic review to investigate the impact of Covid-19 on work and workers of all occupations, which reveal research gaps, and help managers to adapt to organizations amid the pandemic. Its impact, which varies across sectors, has been significant in the construction sector (ILO, 2021). The construction and the engineering sectors were the ones that had to bear the worst brunt of Covid-19, as it was already battling a liquidity crunch as fallout of the non-banking financial institutions in thefinancial sector since the beginning of 2020. According to a new study tracking the results of more than 730,000 COVID-19 tests, it was found that construction workers had the highest positivity rates for asymptomatic cases of any occupation, including healthcare staff, first responders, correctional personnel, elderly care workers, grocery store workers and food service employees (Joe Bousquin, 2020).

This sector, which was already reeling with multiple challenges from lack of capital and credit avenues to insolvencies, multiple frauds and regulatory burden under the Environment Laws and the Real Estate (Regulation and Development) Act, 2016, is now marred by the Covid 19 pandemic, with no likely relief in sight. A very recent study by the KPMG Group describes in detail how the Covid-19 pandemic is affecting the construction sector (Anon., 2020a).The construction sector represents a key component of countries' economies—it is approximately 13% of global GDP—as such, having the availability to perform construction activities with a minimum spread of COVID-19 may help to the financial response to the pandemic (Felipe Araya, 2021). A literature review of studies on the COVID-19 pandemic in supply chain disciplines by Priyabrata Chowdhury *et al.* (2021) also endorses this situation. Contractors are struggling to find enough skilled craft workers even as they continue to be impacted by pandemic-induced project delays and supply chain disruptions, according to a workforce survey from the Associated General Contractors of America and Autodesk (Anon., 2021). The survey results show how the COVID-19 pandemic has created constraints on the demand for work even as it limits the number of workers that contractors can hire.

Many projects remained in the unfinished stages because of the lack of funds. Those that were finished remained unsold, because of changing buyer preferences. At a time when the stakeholders in the construction industry i.e. developers and contractors were treating this period of change as a learning curve, reassessing needs and working out strategic deals, the pandemic brought all construction activity to a grinding halt. To contain the pandemic, like many nations, Government of India has also imposed a lockdown, in many of its states, restricting the movement of people and gatherings. In the construction sector, hordes of workmen toil together to meet the timelines. However, due to the restrictions put in place by the Government, all the construction activity and most of the business activity across the country has halted.

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Beyond the short-term impact of an economic downturn on construction demand, the crisis is also expected to hit long-term supply and demand, resulting in lasting shifts in investment patterns. Although a high level of economic uncertainty persists, research from the McKinsey Global Institute suggests that economic activity could be back on track by early 2021—if the virus is contained within the next few months and the right economic policies are enacted. However, longer-term lockdowns or other severe restrictions, even intermittent ones, could result in a severe and sustained economic downturn, with economic activity returning to 2019 levels by 2023 at the earliest (Anon., 2020b).

There are multiple consequences of the lockdown, which would further stretch the troubles for the sector like reverse migration, disruption of supply chains, amongst others. Cumulatively, the above circumstances would cause hindrance in meeting the obligations under the construction and engineering contracts and would lead to multiple legal wrangles for the industry post lifting of the current restrictions. The problems of the construction and engineering sectors in India is aggravated and difficult to address as there is no standard form or format for contracts followed by the industry. There could be innumerable variations in as many General and Special Conditions of a Construction and Engineering Contract. Although, standard forms of construction and engineering contracts by International Federation of Consulting Engineers (FIDIC), Institution of Civil Engineers (ICE) or Indian Institute of Architects (IIA) are widely adopted, but, at times they are zealously negotiated and hence modified/amended so as to lose uniformity. Additionally, there are separate standard forms of contracts adopted by the National Highway Authority of India (NHAI), Public Works Department (PWD), Delhi Metro Rail Corporation (DMRC), Central Public Works Department (CPWD), National Building Construction Corporation (NBCC), Model Engineering Procurement and Construction (EPC) and contract for construction works by Niti Aayog. The Ministry of Finance (Govt. of India) has issued various standard guidelines for contracts and procurement of works such as item rate contracts and lumpsum contracts, Model EPC Agreement byIndian Railways, etc., making it impossible to exhaustively deal with issues that could arise on account of Covid-19 and their solutions. The contractual implications as detailed by Julian Bailey *et al.* (2020) are many-fold. However, some of the common issues that could arise in some form in most of the construction and engineering contracts can be as follows:

FINDINGS

A. The toll on residential and commercial real estate

The exodus of migrant workers or informal sector workers (a bulk of whom find employment in the construction industry in Tier I and Tier II cities), took a toll on the supply chain due to a ban on inter-state travel. It also pushed up operating costs as commodity prices (raw materials for the construction industry) were in shortsupply. The demand for residential real estate was also on a back footing, as aspirational homeowners kept their purchase decisions on hold because of various reasons and the uncertainty triggered by the pandemic situation. Additionally, the uncertainty regarding cash flows discouraged the potential buyers to take on the additional burden of loans and EMIs. Home rentals too, took a dip as people renting apartments in the metropolitan cities choseto go back to their hometowns.

Commercial real estate demand also took a beating as work from home/remote work became the new normal that resulted in under-utilization of office spaces. Closure of malls, gyms, cinema theaters and eateries also killed the appetite for commercial infra space. The festival season beginning from October that normally gives a boost to residential purchase, failed to uplift the mood of the affordable segments of population from buying/investing in residential properties.

B. Negative impact on the construction sector and the lowering of GDP

Though the Union Government took a decision of recognizing the pandemic as a *Force Majeure* incident, the *onus* was on the construction industry to deal with the double whammy of Covid - 19 in addition to the already existing sluggish conditions. As the second biggest employment generator, the impact of Covid - 19 on the construction sector, thus led to the lowering of GDP not only in real estate but also several associated sectors. Although the economy of the country is on the recovery mode and steady progress on the administration of the vaccine, the revised standard operating practices with respect of usage of PPE, social distancing, personal hygiene etc. are resulting in the delay of under-development projects. This will further push up financing cost and continue to impact the stakeholders in the construction industry.

Time is the essence of contract

In many construction and engineering contracts, parties generally specify the time for completion and/or expressly state that time is the essence of the contract. A contractor should be careful about such clause(s), as any breach would make the contract voidable at the cost and consequence of the defaulting contractor. Alternatively, the contractor under force of law may be obligated to complete the project beyond the stipulated completion date and also pay compensation for delay to the opposite party/Employer. Section 55 of the Indian Contract Act, 1872 provides for the effect of failure to meet the specified timeline. However, the intention of the parties has to be looked at and not the letter of the clause. The time is generally considered to be the essence of the contract.

However, the Law in certain situations permits extension of

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time to the contractor. Generally, construction and engineering agreements also provide for a buffer period, beyond the stipulated completion date. Such conditions are generally subject to payment of damages or deductions from the payments due to the contractor. However, in case of failure to perform, even in the extended period(s), the aforementioned rigors of Section 55 of the Contract Act would be invoked against the defaulting contractor. It is stated that even in contracts, where time may not be the essence of the contract, upon delay in performance, the innocent party/employer may sue for any loss that may be caused by delay. Thus, it is imperative that any delay beyond the stipulated completion date, is condoned by the doctrine of *force majeure* or the doctrine of frustration of the contract can be applied in favour of the contractor. It is imperative to evaluate if Covid-19 can be considered as *force majeure* event or can be invoked for frustration of a contract.

SUGGESTIONS

Concrete measures to revive and revitalize

The need of the hour for the stakeholders is to unite to give a shot in the arm to the ailing construction sector. Concrete measures such as ensuring safety of informal labourers, increased remuneration to skilled work-force for early completion, removal of liquidity crunch by financial institutions, reduction of interest rates, one-time financing for those about to be completed structures etc. would help the sector overcome these timesof crisis.

The use of technology is going to redefine construction industry in days to come. Not only are stakeholders rethinking on the use of technology to minimize the impact of human capital shocks inthe form ofmigrant labor exodus, Government initiatives such as the Light House Projects in sixIndian cities that will showcase the use of new-age state of the art technology will reduce costs and accelerate the pace of construction in the sector.

II. CONCLUSION

1) Discussing on the effects of Covid-19 on global construction industry, The Civil Engineering Portal (2021) pinpoints the five most essential results for a more straightforward outlook on the situation. Some of the most important effects that created havoc around the world are: 1). The decline in import and export, 2). Reduction in manpower, 3). Decline in income, 4). Burden of paused construction works, and 5). Deduction in the budget. Summarizing the situation, it is essential to have a thorough rebuilding plan after an analysis of all the risksby each player in their respective universes and a proper execution of the plan which should primarily start with an announcement to all stakeholders including financial institutions about the plan so that stakeholders are satisfied and give their thumbs up to the road to recovery.

To say that the companies engaged in the construction and engineering sector, would be affected due to the current unprecedented situation would be an understatement. The various restrictions put in place by the Governments to control the effects of the virus may trigger shortage of raw material and manpower, disrupted supply chain, further creating handicaps in performing contractual obligations. Contraction in consumption demand should be the least of the worries for the sector. Some elements in construction and engineering are imported from countries, which may be more badly affected, creating a domino effect on the entire sector. However, one must safeguard against the inevitable by adopting corrective measures in time. The first step is to evaluate the contract clause(s)to ascertain the extent of liabilities upon breach and the last step is to proactively adopt all measures to mitigate the liability by timely invoking the correct legal doctrine(s).

Now here is the silverline. As per a study undertaken by Research And Markets.com (2021), the global construction market size is declined from USD 11,217.4 billion in 2019 to USD 10,741.2 billion in 2020. However, the industry is showing signs of recovery since the beginning of 2021 and reach a market size of USD 13,572.4 billion in 2024, projecting a CAGR of 6.0% between 2020 and 2024. It is also predicted that heavy and civil engineering sector will be the fastest-growing construction type during the forecast period. The suggestions which include concrete measures to revive and revitalize the construction industry includes safety of workers, increase remuneration to skilled work force.

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Daily Covid Cases and selected Stock Market Indices: An attempt to understand the movements of the NIFTY 50 Index during the pandemic.

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ABSTRACT:

The Covid pandemic has wreaked havoc on the world economy. The present study aims to understand how the Indian stock market reacts to daily covid cases and the movement of other prominent global market indices like NASDAQ, DAX, Shanghai Index, and TOPIX. The researchers have taken the daily data from Jan 2020 to November 2020 for analysis. The objective was to build a simple model that explains the movement of the Nifty 50 index. The stock market indices of respective countries were taken as a proxy of the financial markets, and daily covid cases symbolize the reason for volatility in the world markets. The study has used essential statistical tools like multiple regression, Breusch-Godfrey Serial Correlation L.M. Test, and Breusch-Pagan-Godfrey Heteroskedasticity test. The findings explained the movement of the NIFTY 50 by variables like Daily Covid cases, DAX index, Shanghai index, and TOPIX index.

Keywords: Nifty 50, Covid 19, Global markets.

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1.Introduction

In December 2019, the coronavirus disease 2019 (COVID-19) outbreak began in Wuhan, Hubei region, China. As of March 20, 2020, the virus had already affected more than 500,000 people in more than 60 countries, with around 16% deaths due to this virus. About 5% of the infected patients were in a severe or critical condition, while there seemed to be a recovery rate of 84%.

On February 3, 2020, the Shanghai stock market plunged 8% following China's general distress over COVID-19. This shocking disruption rapidly spread to international financial markets. For example, the United States (U.S.) stock prices logged their lowest in March, and the S&P 500 plummeted 12% between March 4 and March 11, 2020. Initially ignored by many countries, the COVID-19 effect raised serious concerns due to its rapid propagation outside China. The Indian markets were also not spared; on March 23, 2020, Sensex lost 3934 points (13.15%), and Nifty plunged by 1135 points(13%) and closed at 7610 levels.

At volatility, the stock markets' momentum and co-movement pattern change; therefore, it is crucial to understand the impact of the volatility called Covid 19 and other variables like NASDAQ, DAX index, Shanghai index, and TOPIX index on the Nifty 50.

2. Literature Review

(Al-Awadhi et al., 2020) investigated, if communicable infectious disorders affect stock market outcomes. Panel data analysis was used to examine the impact of the COVID-19 virus, a contagious infectious disease, on the Chinese stock market. The data revealed that daily increases in total confirmed cases and total deaths induced by COVID-19 have a significant negative impact on stock returns across the board.

(Anh & Gan, 2020) looked at how the COVID-19 outbreak and subsequent stock market shutdown affected daily stock returns in Vietnam. The study found that the rising daily number of COVID-19 cases had a negative influence on stock returns in Vietnam. The analysis also revealed that the stock market in Vietnam fared differently before and after the nationwide lockdown. Despite the fact that COVID-19 had a major negative influence on Vietnam's stock returns before to the lockdown, the lockdown period had a beneficial overall impact on the stock performance of the entire market and the many business fields in Vietnam. During the COVID-19 outbreak, the financial sector on the Vietnam stock market was a bloodbath. According to the report, the Vietnam stock market rebounded during and after the lockdown due to investors' confidence and trust in the Vietnamese government's decisions to battle COVID-19, as well as attractive stock prices.

(Ichev & Marin, 2018) studied how stock prices in the United States were affected by the geographic closeness of information broadcast by the 2014–2016 Ebola outbreak events combined with strong media coverage. The stocks of corporations having operations in West African countries (WAC) and the United States, as well as events occurring in the WAC and the United States, have the strongest Ebola outbreak event effect. This finding implies that information regarding Ebola outbreak occurrences is more useful for organisations that are geographically closer to both the outbreak's origin and financial markets. The findings also reveal that the effect is stronger for tiny and more volatile companies, as well as those that have received a lot of media attention.The elevated perceived risk also follows the event effect; that is, the implied volatility increases after the Ebola outbreak events.

(Liu et al., 2020) analyzed the influence of the coronavirus outbreak on 21 prominent stock market indexes in major affected nations such Korea, Singapore, the United States, Germany, Japan, Italy, and the United Kingdom, among others. Infectious disease has had far-reaching implications that have had a direct impact on stock markets around the world. The stock markets in major afflicted countries and localities declined sharply after the viral epidemic, according to the findings. In comparison to other countries, Asian countries had greater negative anomalous returns. COVID-19's negative impact on stock indices was confirmed through an effective route, which added up investors' pessimism about future returns and fears of uncertainty.

(Chun-Da Chen et al., 2009) investigates whether the SARS outbreak in 2003 had a favourable impact on Taiwan's stock market. The empirical findings suggest that the SARS outbreak had a negative influence on tourism, as well as the wholesale and retail industries. Many earlier research have supported this finding, but the most important point is that the biotechnology sector experienced favourable effects as a result of the SARS outbreak. Within our sample firms, the value effect of the SARS outbreak appears to be asymmetrical. During the SARS outbreak in

Taiwan, fund managers and investors might acquire and hold biotechnology stocks and rearrange their portfolios to gain investment profits, maintain portfolio returns, or reduce investment risks.

(Ashraf, 2020) investigate how the stock market reacted to the COVID-19 epidemic. Using data on daily COVID-19 confirmed cases and deaths, as well as stock market returns from 64 countries from January 22, 2020 to April 17, 2020, we discovered that stock markets reacted unfavourably to the increase in COVID-19 confirmed cases. That is, as the number of confirmed instances increased, stock market returns decreased. When the number of confirmed cases increased, stock markets reacted more quickly than when the number of deaths increased. According to the data, negative market reaction was most during the early days of verified cases and between 40 and 60 days following the initial confirmed cases.

(Goodell, 2020) emphasises COVID-19's massive economic and social impact in publications that either predicted such a large-scale catastrophe and its economic implications, or examined the effects of earlier epidemics and pandemics. Drawing on a number of literatures, a brief examination of the potential consequences of COVID-19 on financial markets and institutions, either directly or indirectly, is presented.

Considering the characteristics of COVID-19 and what research suggests have been the impacts of other past events that in some ways roughly parallel COVID-19 points toward avenues of future investigation.

2004 (Nippani & Washer) The impact of SARS on the stock markets of Canada, Indonesia, China, the Philippines, Singapore, Thailand, and Vietnam is investigated. The major stock indexes of these countries during the SARS outbreak are compared to the S&P 1200 Global Index and a non-SARS timeframe. The study employed traditional t-tests as well as the non-parametric Mann-Whitney test. Except for China and Vietnam, SARS had little significant influence on the stock markets of the nations impacted.

3. Objectives

- To understand the relationship among various variables like the Nifty 50 index, NASDAQ, Daily Covid cases, DAX index, Shanghai index and TOPIX index for the period starting from Jan 2020 to November 2020 (post the outbreak of covid 19 pandemic)

- To build a successful model to explain the nifty 50 index movement based on the other variables' changes.

4. RESEARCH METHODOLOGY

Research type

The research is exploratory in nature.

Sources of Data

The data is collected using secondary sources, as mentioned.

NASDAQ, TOPIX, NIFTY 50, DAX and Shanghai Index-Investing.com (Website)

Daily Covid Cases-Website of World Health Organization.

Tools and Techniques

Multiple Regression

The link between numerous independent or predictor variables and one dependent or criterion variable is explained by multiple regression. A dependent variable is shown as a function of numerous independent variables and their coefficients, as well as the constant term. Multiple regression necessitates the presence of two or more independent variables, hence the name.

The multiple regression equation explained, takes the following form:

$$y = b_1x_1 + b_2x_2 + \ldots + b_nx_n + c.$$

Here, b_i's (i=1,2…n) are the regression coefficients, representing the value at which the criterion variable changes when the predictor variable changes.

Breusch–Godfrey test

The Breusch–Godfrey test is a method for determining the validity of regression-like models when applied to observed data. It checks for serial correlation in the proposed regression model, which, if found, indicates that the model is fictitious.

The Breusch–Godfrey test is a test for autocorrelation in regression model errors that leverages the residuals from the model being used in the regression analysis to generate a test statistic. The model's null hypothesis is that no serial correlation of any rank up to p exists.

Breusch Pagan Godfrey Test for Heteroscedasticity

The Breusch-Pagan-Godfrey Test is a regression error heteroscedasticity test. In contrast to homoscedasticity, which means "same scatter," heteroscedasticity indicates "differently scattered." Homoscedasticity is a crucial assumption in regression; if it is broken, the regression model will fail.

The test statistic follows a chi-square distribution to a large extent.

• For this test, the null hypothesis is that the error variances are all equal.

• Another possibility is that the error variances are not equal. More particular, when Y rises, so do the variances (or decrease).

A small chi-square value (along with an associated small p-value) indicates that it accepts the null hypothesis (i.e., that the variances are all equal).

Variance Inflation Factor

The variance inflation factor (VIF) is used to determine if a set of multivariate regression variables is multicollinear. The VIF for a regression model variable is equal to the ratio of the total model variance to the variance of a model that just includes that single independent variable in mathematics. For each independent variable, this ratio is determined. A high VIF shows that the linked independent variable is substantially collinear with the other variables, resulting in a misleading regression model. Multicollinearity must be detected because, while it does not lower the explanatory capacity of the model, it does reduce the statistical significance of the independent variables.

5. Results and Analysis

Regression Model

Dependent Variable: NIFTY

Method: Least Squares

Date: 01/28/21   Time: 16:49

Sample (adjusted): 3 184

Included observations: 182 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
NASDAQ	0.119022	0.071961	1.653978	0.0999
LAGNASDAQ	-0.031861	0.063598	-0.500981	0.6170
LAGNIFTY	-0.109863	0.065489	-1.677580	0.0952
DAILY_COVID_CASES	0.113786	0.056356	2.019066	0.0450
DAX	0.302610	0.069436	4.358126	0.0000
SHANGHAI	0.136029	0.044796	3.036620	0.0028
TOPIX	0.161351	0.060689	2.658664	0.0086
C	7.75E-05	0.000760	0.102014	0.9189

R-squared	0.471800	Mean dependent var	-0.000253
Adjusted R-squared	0.450551	S.D. dependent var	0.013604
S.E. of regression	0.010084	Akaike info criterion	-6.312772
Sum squared resid	0.017694	Schwarz criterion	-6.171936
Log likelihood	582.4622	Hannan-Quinn criter.	-6.255679
F-statistic	22.20296	Durbin-Watson stat	1.868968
Prob(F-statistic)	0.000000		

Source: E views

Serial Correlation Test

Breusch-Godfrey Serial Correlation LM Test:

Null hypothesis: No serial correlation at up to 2 lags

F-statistic	1.309266	Prob. F(2,172)	0.2727
Obs*R-squared	2.729223	Prob. Chi-Square(2)	0.2555

Source: E views

Test Equation:

Dependent Variable: RESID

Method: Least Squares

Date: 01/28/21   Time: 16:50

Sample: 3 184

Included observations: 182

Heteroskedasticity Test:

Heteroskedasticity Test: Breusch-Pagan-Godfrey

Null hypothesis: Homoskedasticity

F-statistic	1.564379	Prob. F(7,174)	0.1489
Obs*R-squared	10.77595	Prob. Chi-Square(7)	0.1487
Scaled explained SS	21.10335	Prob. Chi-Square(7)	0.0036

Source: E views

Test Equation:

Dependent Variable: RESID^2

Method: Least Squares

Date: 01/28/21   Time: 16:50

Sample: 3 184

Included observations: 182

Variance Inflation Index(Multicollinearity test)

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
NASDAQ	0.005178	1.925195	1.916436
LAGNIFTY	0.004289	1.416719	1.416092
LAGNASDAQ	0.004045	1.504508	1.497300
DAX	0.004821	2.398459	2.398456
DAILY_COVID_C ASES	0.003176	1.096074	1.077006
SHANGHAI	0.002007	1.312315	1.311325
TOPIX	0.003683	1.669847	1.669844
C	5.77E-07	1.033324	N.A.

Source: E views

6. Findings and Suggestions

- Researchers built a successful regression model that satisfied the conditions of normality, autocorrelation, and heteroskedasticity.
- The analysis found that 45% of the Nifty 50 movements can be explained using the changes in Daily Covid cases, DAX index, Shangai index and TOPIX index.
- Contrary to the researcher's expectation, the Nasdaq values, lagged Nasdaq values and lagged Nifty values do not explain the Nifty 50 index changes during the period.
- Lagged nifty values were unable to explain the spot nifty index during the research period.
- The Nifty is influenced by the Chinese, German and Japanese markets primarily due to the contagion effect. When the pandemic's full scope became evident, from March 2020, the global markets started reacting strongly to it, resulting in the contagion.

- The Indian markets move in tandem with the other Asian counterparts in the case of unexpected volatility in the global economy.
- The global covid daily cases and nifty 50 index shows a co-movement pattern. This draws the picture that Indian investors did not turn conservative due to the international scenario of covid cases. They preferred to view the market based on domestic cases, and hence the market reacted in the same way.

Conclusion and future research directions

The research based on a short-term period has proven that Indian markets mimic other Asian Markets during volatility. The lagged values of Nifty not impacting the spot index also say that investors are making their investment decisions as per the momentum in the global markets. These results express that covid figures that symbolize volatility have triggered different responses among the variables and may be a factor investors should consider at the time of portfolio allocation. The study is basic in nature; hence the researchers may delve deep into the interrelationship-based research among the different stock markets and nifty by including the latest data sets and advanced econometric tools.

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The Impact of Covid-19 on Construction and Engineering Sectors in India and Elsewhere

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Abstract: The Covid-19 pandemic has devastated the world of work. Its impact, which varies across sectors, has been significant in the construction sector also. The construction and the engineering sectors were the ones that had to bear the worst brunt of Covid-19, as it was already battling a liquidity crunch as fallout of the non-banking financial institutions in the financial sector since the beginning of 2020. This article analyses the Covid-19 pandemic situation and its effect on construction and engineering sectors in Indian and elsewhere. it is essential to have a thorough rebuilding plan after an analysis of all the risks by each player in their respective universes and a proper execution of the Concrete measures for reviving the construction sector includes ensuring safety of informal labourers, increased remuneration to skilled work force, reduction of interest rates.

Keywords — Construction, Corona virus, Covid-19, Engineering, Financial sector, Liquidity crunch

I. INTRODUCTION

The world today stands under the recovery phase from the severe attack of the Coronavirus or the Covid-19 pandemic. Almost every commercial activity is suffering at the hands of the ruthless Covid-19. The hardest affected sector, the construction and engineering sector is definitely on the wrong end of the curve. (Kohli and Chadha (2020). The COVID-19 pandemic has devastated the world of work. An article by Sigahi *et al.* (2021) presents a systematic review to investigate the impact of Covid-19 on work and workers of all occupations, which reveal research gaps, and help managers to adapt to organizations amid the pandemic. Its impact, which varies across sectors, has been significant in the construction sector (ILO, 2021). The construction and the engineering sectors were the ones that had to bear the worst brunt of Covid-19, as it was already battling a liquidity crunch as fallout of the non-banking financial institutions in thefinancial sector since the beginning of 2020. According to a new study tracking the results of more than 730,000 COVID-19 tests, it was found that construction workers had the highest positivity rates for asymptomatic cases of any occupation, including healthcare staff, first responders, correctional personnel, elderly care workers, grocery store workers and food service employees (Joe Bousquin, 2020).

This sector, which was already reeling with multiple challenges from lack of capital and credit avenues to insolvencies, multiple frauds and regulatory burden under the Environment Laws and the Real Estate (Regulation and Development) Act, 2016, is now marred by the Covid 19 pandemic, with no likely relief in sight. A very recent study by the KPMG Group describes in detail how the Covid-19 pandemic is affecting the construction sector (Anon., 2020a).The construction sector represents a key component of countries' economies—it is approximately 13% of global GDP—as such, having the availability to perform construction activities with a minimum spread of COVID-19 may help to the financial response to the pandemic (Felipe Araya, 2021). A literature review of studies on the COVID-19 pandemic in supply chain disciplines by Priyabrata Chowdhury *et al.* (2021) also endorses this situation. Contractors are struggling to find enough skilled craft workers even as they continue to be impacted by pandemic-induced project delays and supply chain disruptions, according to a workforce survey from the Associated General Contractors of America and Autodesk (Anon., 2021). The survey results show how the COVID-19 pandemic has created constraints on the demand for work even as it limits the number of workers that contractors can hire.

Many projects remained in the unfinished stages because of the lack of funds. Those that were finished remained unsold, because of changing buyer preferences. At a time when the stakeholders in the construction industry i.e. developers and contractors were treating this period of change as a learning curve, reassessing needs and working out strategic deals, the pandemic brought all construction activity to a grinding halt. To contain the pandemic, like many nations, Government of India has also imposed a lockdown, in many of its states, restricting the movement of people and gatherings. In the construction sector, hordes of workmen toil together to meet the timelines. However, due to the restrictions put in place by the Government, all the construction activity and most of the business activity across the country has halted.

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Beyond the short-term impact of an economic downturn on construction demand, the crisis is also expected to hit long-term supply and demand, resulting in lasting shifts in investment patterns. Although a high level of economic uncertainty persists, research from the McKinsey Global Institute suggests that economic activity could be back on track by early 2021—if the virus is contained within the next few months and the right economic policies are enacted. However, longer-term lockdowns or other severe restrictions, even intermittent ones, could result in a severe and sustained economic downturn, with economic activity returning to 2019 levels by 2023 at the earliest (Anon., 2020b).

There are multiple consequences of the lockdown, which would further stretch the troubles for the sector like reverse migration, disruption of supply chains, amongst others. Cumulatively, the above circumstances would cause hindrance in meeting the obligations under the construction and engineering contracts and would lead to multiple legal wrangles for the industry post lifting of the current restrictions. The problems of the construction and engineering sectors in India is aggravated and difficult to address as there is no standard form or format for contracts followed by the industry. There could be innumerable variations in as many General and Special Conditions of a Construction and Engineering Contract. Although, standard forms of construction and engineering contracts by International Federation of Consulting Engineers (FIDIC), Institution of Civil Engineers (ICE) or Indian Institute of Architects (IIA) are widely adopted, but, at times they are zealously negotiated and hence modified/amended so as to lose uniformity. Additionally, there are separate standard forms of contracts adopted by the National Highway Authority of India (NHAI), Public Works Department (PWD), Delhi Metro Rail Corporation (DMRC), Central Public Works Department (CPWD), National Building Construction Corporation (NBCC), Model Engineering Procurement and Construction (EPC) and contract for construction works by Niti Aayog. The Ministry of Finance (Govt. of India) has issued various standard guidelines for contracts and procurement of works such as item rate contracts and lumpsum contracts, Model EPC Agreement byIndian Railways, etc., making it impossible to exhaustively deal with issues that could arise on account of Covid-19 and their solutions. The contractual implications as detailed by Julian Bailey *et al.* (2020) are many-fold. However, some of the common issues that could arise in some form in most of the construction and engineering contracts can be as follows:

FINDINGS

A. The toll on residential and commercial real estate

The exodus of migrant workers or informal sector workers (a bulk of whom find employment in the construction industry in Tier I and Tier II cities), took a toll on the supply chain due to a ban on inter-state travel. It also pushed up operating costs as commodity prices (raw materials for the construction industry) were in shortsupply. The demand for residential real estate was also on a back footing, as aspirational homeowners kept their purchase decisions on hold because of various reasons and the uncertainty triggered by the pandemic situation. Additionally, the uncertainty regarding cash flows discouraged the potential buyers to take on the additional burden of loans and EMIs. Home rentals too, took a dip as people renting apartments in the metropolitan cities choseto go back to their hometowns.

Commercial real estate demand also took a beating as work from home/remote work became the new normal that resulted in under-utilization of office spaces. Closure of malls, gyms, cinema theaters and eateries also killed the appetite for commercial infra space. The festival season beginning from October that normally gives a boost to residential purchase, failed to uplift the mood of the affordable segments of population from buying/investing in residential properties.

B. Negative impact on the construction sector and the lowering of GDP

Though the Union Government took a decision of recognizing the pandemic as a *Force Majeure* incident, the *onus* was on the construction industry to deal with the double whammy of Covid - 19 in addition to the already existing sluggish conditions. As the second biggest employment generator, the impact of Covid - 19 on the construction sector, thus led to the lowering of GDP not only in real estate but also several associated sectors. Although the economy of the country is on the recovery mode and steady progress on the administration of the vaccine, the revised standard operating practices with respect of usage of PPE, social distancing, personal hygiene etc. are resulting in the delay of under-development projects. This will further push up financing cost and continue to impact the stakeholders in the construction industry.

Time is the essence of contract

In many construction and engineering contracts, parties generally specify the time for completion and/or expressly state that time is the essence of the contract. A contractor should be careful about such clause(s), as any breach would make the contract voidable at the cost and consequence of the defaulting contractor. Alternatively, the contractor under force of law may be obligated to complete the project beyond the stipulated completion date and also pay compensation for delay to the opposite party/Employer. Section 55 of the Indian Contract Act, 1872 provides for the effect of failure to meet the specified timeline. However, the intention of the parties has to be looked at and not the letter of the clause. The time is generally considered to be the essence of the contract.

However, the Law in certain situations permits extension of

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time to the contractor. Generally, construction and engineering agreements also provide for a buffer period, beyond the stipulated completion date. Such conditions are generally subject to payment of damages or deductions from the payments due to the contractor. However, in case of failure to perform, even in the extended period(s), the aforementioned rigors of Section 55 of the Contract Act would be invoked against the defaulting contractor. It is stated that even in contracts, where time may not be the essence of the contract, upon delay in performance, the innocent party/employer may sue for any loss that may be caused by delay. Thus, it is imperative that any delay beyond the stipulated completion date, is condoned by the doctrine of *force majeure* or the doctrine of frustration of the contract can be applied in favour of the contractor. It is imperative to evaluate if Covid-19 can be considered as *force majeure* event or can be invoked for frustration of a contract.

SUGGESTIONS

Concrete measures to revive and revitalize

The need of the hour for the stakeholders is to unite to give a shot in the arm to the ailing construction sector. Concrete measures such as ensuring safety of informal labourers, increased remuneration to skilled work-force for early completion, removal of liquidity crunch by financial institutions, reduction of interest rates, one-time financing for those about to be completed structures etc. would help the sector overcome these timesof crisis.

The use of technology is going to redefine construction industry in days to come. Not only are stakeholders rethinking on the use of technology to minimize the impact of human capital shocks inthe form ofmigrant labor exodus, Government initiatives such as the Light House Projects in sixIndian cities that will showcase the use of new-age state of the art technology will reduce costs and accelerate the pace of construction in the sector.

II. CONCLUSION

1) Discussing on the effects of Covid-19 on global construction industry, The Civil Engineering Portal (2021) pinpoints the five most essential results for a more straightforward outlook on the situation. Some of the most important effects that created havoc around the world are: 1). The decline in import and export, 2). Reduction in manpower, 3). Decline in income, 4). Burden of paused construction works, and 5). Deduction in the budget. Summarizing the situation, it is essential to have a thorough rebuilding plan after an analysis of all the risksby each player in their respective universes and a proper execution of the plan which should primarily start with an announcement to all stakeholders including financial institutions about the plan so that stakeholders are satisfied and give their thumbs up to the road to recovery.

To say that the companies engaged in the construction and engineering sector, would be affected due to the current unprecedented situation would be an understatement. The various restrictions put in place by the Governments to control the effects of the virus may trigger shortage of raw material and manpower, disrupted supply chain, further creating handicaps in performing contractual obligations. Contraction in consumption demand should be the least of the worries for the sector. Some elements in construction and engineering are imported from countries, which may be more badly affected, creating a domino effect on the entire sector. However, one must safeguard against the inevitable by adopting corrective measures in time. The first step is to evaluate the contract clause(s)to ascertain the extent of liabilities upon breach and the last step is to proactively adopt all measures to mitigate the liability by timely invoking the correct legal doctrine(s).

Now here is the silverline. As per a study undertaken by Research And Markets.com (2021), the global construction market size is declined from USD 11,217.4 billion in 2019 to USD 10,741.2 billion in 2020. However, the industry is showing signs of recovery since the beginning of 2021 and reach a market size of USD 13,572.4 billion in 2024, projecting a CAGR of 6.0% between 2020 and 2024. It is also predicted that heavy and civil engineering sector will be the fastest-growing construction type during the forecast period. The suggestions which include concrete measures to revive and revitalize the construction industry includes safety of workers, increase remuneration to skilled work force.

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CREDIT RISK ASSESSMENT WITH FEATURE SELECTION TECHNIQUES

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Abstract

Nowadays granting credit is a complex task because a credit database has a huge amount of data and it also contains irrelevant and redundant information.The unrelated and surplus data can reduce the accuracy of classification and prediction. In such a scenario,feature selection becomes indispensable to deal with bigdata.Feature selection is a preprocessing techniques used to reduce the features before applying classification and prediction. So feature selection can improve the efficiency and accuracy of prediction. In this paper we compared the efficiency of five different feature selection methods InfoGainAttributEval, GainRatioAttributeEval, CorrelationAttributeEval and ReliefAttributeEval by using four classification algorithms Naïve Bayes, J48, IBK and SMO.

A SURVEY ON CLOUD COMPUTING SECURITY USING DIFFERENT CRYPTOGRAPHIC ALGORITHMS

Article · February 2022

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A SURVEY ON CLOUD COMPUTING SECURITY USING DIFFERENT CRYPTOGRAPHIC ALGORITHMS

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Abstract
Cloud Computing is an emerging paradise that has become the hottest research space today because of its ability to reduce computer-related costs. In modern times, it is a very interesting and attractive technology that provides services to their users on demand online. As Cloud Computing stores data and distributes resources in an open space, security has become a major obstacle to cloud deployment. Although Cloud Computing is promising and efficient, there are many data security challenges as there is no cloud user space. Keywords- Cloud Computing, Data Security, Algorithms, Encryption, Decryption

1.INTRODUCTION

Cloud Computing is a driving force for many small, medium and large companies and as more and more cloud users seek cloud computing services, their biggest concern is the security of their data in the cloud. Data protection is always very important and due to the critical nature of cloud computing and the large amount of complex data it carries, the need is even more important. From now on, concerns about data privacy and security seem to be an obstacle to the widespread adoption of cloud computing services. Anyone looking for a cloud service to either an individual or a company should ask the appropriate questions to the cloud provider before handling their data or applications in the cloud. Upcoming cloud providers should let you know; Are they financially sound? Do they have good safety policies and procedures in place? Is the infrastructure designed to handle your shared data with more users, or will it be segmented? As more companies move their data to the cloud the data becomes more flexible and there are more challenges to overcome. To be successful, cloud data security depends on more than just the use of appropriate data security procedures and countermeasures. Computer-based security measures generally use user authorization and authentication.

2. DATA SECURITY ISSUES IN THE CLOUD

Data protection on cloud computing, as an anti-virus software for cloud applications, serves to protect digital information from any threats that may compromise its integrity. Data stored on the Internet usually contains confidential information - such as addresses, payment details and medical records - that are targeted at cyber criminals. Security techniques are used to combat cyber threats and vulnerabilities, ensuring that data is not leaked which could jeopardize their personal information that has been leaked.

If the data is in transit, which means it travels between locations, it needs to be protected. When data flows between networks - cell phones, Wi-Fi or otherwise - it is generally considered to be less secure as it may fall off the firewall, meaning that cloud security and privacy are at stake. If you find a security guard to protect your information, you should be sure to cover the data when you are on the move. Many security features choose to encrypt data inside the cloud infrastructure while on the road to protect it.

2.1 Types of Cloud Security:

There are 4 main types of cloud computing: private clouds, public clouds, hybrid clouds, and multiclouds. There are also 3 main types of cloud computing services: Infrastructure-as-a-Service (IaaS), Platforms-as-a-Service (PaaS), and Software-as-a-Service (SaaS)

1. IAAS:

Infrastructure As A Service (IAAS) is a way to deliver computer infrastructure as much-needed services. It is one of the three most important applications of cloud storage network operating system model. In the Server Database Center for purchasing servers or network equipment and renting out those resources as a

fully deployed service may require a model. Allows flexible rating and resources are still distributed as a service. usually involving multiple users on a single piece of hardware.
2. PAAS:
Platform As A Service (PAAS) is a cloud delivery application model built with third-party operating services. It provides expandable scales for your application while allowing developers to build applications and services online and usage includes public, private and mixed.

3. SAAS:
Software As A Service (SAAS) allows the user to use an existing Internet system and is a software model used as a hosting service and accessed Output Rephrase Online text or software delivery model in which software and related data are used. hosted locally and accessed through their client, usually an online browser over the web. SAAS services are used for the development and distribution of modern applications.

2.2 Security Issues in Cloud Computing :
There is no doubt that Cloud Computing offers various benefits but there are also security issues in the cloud computing. Below are the following Security Issues in Cloud Computing as follows.

Data Loss - Data Loss is one of the problems facing Cloud Computing. This is also known as Data Leaks. As we know our sensitive data is in someone else's hands, and we do not have complete control over our website. Therefore if cloud service security is compromised by hackers it is likely that hackers will gain access to our sensitive data or personal files.

Disruption of Hackers and Unprotected API's - As we know when we talk about the cloud and its services it means we are talking about the internet. Also, we know that the easiest way to connect to Cloud is to use the API. It is therefore important to protect Interface's and API's used by an external user. But also in the cloud computing, a few services are available on the public domain. Part of the risk is Cloud Computing because these services may be accessible to third parties. It is therefore possible that with the help of these services hackers can easily hack or damage our data.

User Account Hijacking - Account hijacking is a very serious security issue in Cloud Computing. If in some way a User or Organization Account has been hijacked by Hacker. The criminal then has full authority to do unauthorized activities.

Changing Service Provider - Vendor lock is also an important security issue in Cloud Computing. Many organizations will deal with a variety of issues as they move from one vendor to another. For example, the Organization wants to move from AWS Cloud to Google Cloud Services and deal with various problems such as data transfer, and both cloud services have different strategies and functions, so they also deal with problems in that regard. Also, AWS costs may be different from Google Cloud, etc.

Lack of skills - While working, switching to another service provider, you need an additional feature, how to use the feature, etc. are the main problems caused by an IT Company that does not have a skilled Worker. So it takes a skilled person to work with cloud computing.
Denial of Service (DoS) Attack - This type of attack occurs when the system receives too much traffic. Mostly DoS attacks occur in large organizations such as the banking sector, the public sector, etc. In the event of a DoS attack the data is lost. So to recover data, it requires a large amount of money and time to manage it.

3.**CLOUD COMPUTING SECURITY ALGORITHMS**

In cloud computing, encryption algorithms play a key role in providing secure connectivity with connected and distributed resources. It basically converts data into encrypted data to protect it using “key,” and messaging users have the key to clear data encryption.

Basically there are two types of encryption key techniques: symmetric key encryption and asymmetric key encryption. A single key is used to encrypt and decrypt data for a Symmetric key encryption. In contrast, the asymmetric key encryption uses two keys - the public encryption key and the secret encryption key.

There are several techniques used to create the best data security in cloud storage and to ensure secure connections. Encryption methods convert a message or plain text into encrypted text, and encryption techniques produce the actual message or explicit text into the same quote text. In this post, we will look at the top 10 cloud protection algorithms designed to provide better and more secure data protection in the cloud.

1. RSA Algorithm

RSA is a Public Key algorithm that provides encryption and removes data encryption so that only authorized users can access it. The RSA represents Ron Rivest, Adi Shamir, and Len Adleman, who first introduced it in 1977. Data is encrypted, and encrypted in the cloud. User requests a cloud provide when a user wants data, first authorizes the user then provides the data needed.

An external company may detect the Cloud service provider's misconduct from time to time by requesting proof of a fixed number of blocks other than the total number of file blocks [4]. Every message blog is mapped to a numerical value. The RSA algorithm contains a Public Key and a Private Key. The public key is known to all cloud users, while Private-Key is known only to the user who first became the data owner. The Cloud service provider performs the encryption, and the Cloud / client user performs the encryption. If the data is encrypted with the Public key, it can be removed encrypted with the corresponding Private Key.

2. Blowfish Algorithm

One of the most common social algorithms provided by Bruce Schneier, Blowfish algorithm, is a symmetric key algorithm, which works almost like a DES Algorithm, where the key is small and can be easily encrypted. However, in the Blowfish algorithm, the key size is large, and can vary from 32 bits to 448 bits. Blowfish also contains 16 rounds and can encrypt eight-dimensional data, and if the message size is not eight times larger, then the bits are secure.

In the Blowfish algorithm too, 64 bits of blank text are divided into two parts of the message as a size of 32 bits in length. One part benefits as the left part of the message, and the other part the right part of the message. The left part of the message says XOR with P-elements - the same members create a certain number, after that number is transferred to the translation function F. The value started in the translation function is then processed as XOR and another part of the message. , with the right pieces, after which F | the function is called which changes the left part of the message and P | return to the right side of the message.

3. Diffie Hellman Key Exchange (D-H)

Whitfield Diffie and Martin Hellman found a key location for the Diffie Hellman algorithm. It is a secure exchange strategy using cryptographic keys on a social network and has been a key sample of public key cryptography. Only two users will be allowed to exchange private passwords over a trusted network. These two users do not need prior knowledge about the secrets of sharing information between them. Considered the difficulty of combining different logarithms of key numbers. It needs two large numbers, one first (P) and one (G), the old P root.

4. Elliptic Curve Cryptography Algorithm

Elliptic Curve Cryptography Algorithm was discovered by Neil Koblitz (University of Washington) and Victor Miller (IBM) in 1985. It is a public key encryption technique that depends upon discrete algorithms, which is utilized to create efficient, quicker, and smaller cryptographic keys. Elliptic curve public-key cryptography (ECC) is an innovative approach based on the algebraic structure of elliptic curves over finite fields with low key size. The ECC deals with two points (x, y), which satisfies the equation y2 =x3 +ax+b with some condition (4a3 +27b2 =0) by sharing the secret key. The points that lie on the curve operate as a public key, and random numbers are used as private key encryption. ECC is used in some integer factorization algorithms that have applications in cryptography.

5. Data Encryption Standard (DES) Algorithm

Data cryptography (DES) symmetric-key block cipher was acquired as FIPS46 within the Federal Register in January 1977 by the National Institute of Standards and Technology (NIST). On the encryption site, DES takes 64-bit plain text and creates a 64-bit ciphertext text, after which the encryption site takes over 64-bit ciphertext text and creates 64-bit transparent text. Each typewriter uses the same 56-bit cipher key. The encryption process is done with two permissions (P-boxes), commonly referred to as first and last permissions, and sixteen rounds of Feistel [17]. Each cycle transmits a different 48-bit round key generated from the cipher key encryption.

6**. El Gamal Encryption**

The El Gamal encryption system is an unbalanced key encryption system for cryptography of public keys, based on the Diffie-Hellman key exchange system through cryptography. Taher Elgamal painted it in 1984. ElGamal encryption is protected by the free GNU Privacy Protection software, the latest versions of PGP, and other cryptosystems. The Digital Signature Algorithm contains information about the variations of the ElGamal signature system, which should not be confused with ElGamal encryption. ElGamal encryption can be defined over any G-group group. Its security is based on the severity of a particular G-related factor in the calculation of different logarithms.

7**. Enhanced Encryption Standard (AES)**

The Advanced Encryption Standard is a new secret code proposed by NIST to replace DES. AES contains three cipher blocks: AES-128, AES-192, and AES-256. AES-128 uses 128-bit key lengths to encrypt and decrypt message encryption, while AES-192 uses 192-bit key lengths, and AES-256 256-bit key lengths encryption and decryption of messages. Each cipher encrypts and removes data encryption in 128-bit blocks, using 128, 192, and 256-bit cryptographic keys.

Symmetric, also known as a secret key, ciphers use the same key in encryption and decryption, so both sender and recipient must know the same secret key - and use it -. Advanced Privacy Information requires a key length of 192 or 256 bits. Ten rounds are available with 128-bit keys, 12 rounds of 192-bit keys, and 14 rounds with 256-bit keys. The cycle consists of a number of processing steps that include modifying, converting, and mixing blank text input to convert it to the final cipher text output.

8. Digital Signature Algorithm (DSA)

The digital signature algorithm (DSA) refers to the level of digital signature. The National Institute of Standards and Technology (NIST) introduced in 1991 as the best way to create digital signatures. Along with RSA, DSA is considered one of the most popular digital signature algorithms today. DSA does not encrypt message alert using a secret key or remove message alert encryption using a public key. Instead, it uses different mathematical functions to create a digital signature that includes two 160-bit numbers from message processing and a secret key. DSAs use a public key to authenticate a signature, but compared to RSA, the verification process is much more complicated.

4. PROPOSED WORK

In [1] Thus, in our proposed service, only authorized users can access the data. Even if an unauthorized user receives data accidentally or intentionally when we retrieve data, we cannot remove the encryption and retrieve original data from it. From now on, data security is provided using the RSA algorithm.

In [2] This paper discusses various encryption methods to overcome the dangers posed by computer cloud. Among these, AES encryption is the fastest and most flexible and easy-to-use method. The AES algorithm has a high level of security because 128, 192 or 256-bit keys are used in this algorithm. Various attacks such as square attacks, main attacks, critical find attacks were resisted. Therefore, the AES algorithm is the most

secure encryption algorithm. Data can also be protected from future attacks such as smash attacks. The AES encryption algorithm has minimal storage space and high performance without any weaknesses and limitations while other symmetric algorithms have weaknesses and differences in performance and storage space.
In [3] We are integrating a proposed proxy re-encryption system with clear codes over exponents. The Threshold proxy encryption system supports encoding, transmission, and component functions in a distributed manner. In order to decrypt the encrypted k-message encoded in code word symbols, each key server must decrypt two codecs encoding in our system. Using the threshold proxy re-encryption system, we are introducing a secure cloud storage system that provides secure data storage and secure data transfer functionality in a distributed space. In addition, each storage server independently encrypts and encrypts and each key server independently performs the encryption.
In [4] This paper represents security measures, which protect the data of malicious users in the cloud and is completely avoided by the DiffieHellman key exchange algorithm. This paper also addresses the problems of access control using the appropriate two-factor authentication method. D-H protocol fits better in this situation as the number of users in the cloud is much higher and key management is very difficult. Our proposed system eliminates the importance of key statistics and their management. The use of AES cryptographic algorithms in the cloud computing environment is also included in this paper. Providing data protection for users in the cloud will empower the data owner by disregarding the data to access it.
In [5] To ensure the integrity of the data uploaded to the cloud server, it is important to allow the third-party auditor to check the quality of the exported data content on the cloud server. The public audit system allows customers to assign data to an external company to verify data integrity as it itself may be unstable or may not have the necessary accounting resources to perform periodic authentication. However, submitting a data integrity verification function to a third party (TPA) raises privacy issues as TPA may retrieve actual data content from the server during the verification process. The proposed system therefore uses a public monitoring system for cloud data protection while protecting the privacy of user data. ElGamal encryption and the SHA-256 hash algorithm are used to ensure that TPA does not have access to data extracted from outside the cloud server while performing integrity checks thereby increasing the efficiency of the test process. This removes the test function from the customer and reduces the concern of cloud users that their uploaded data may be accessed by an organization or individual.

6. CONCLUSION

Cloud computing provides storage services to users over the Internet. The resources made available to users by CSPs has reduced the need for expenditures on infrastructure. The Cloud is used for numerous activities but prominent among them are computation and storage. This paper focused on different algorithms used in Cloud storage. A survey on the algorithms used for the secured data storage in cloud is discussed here.

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Experimental investigations on unglazed photovoltaic-thermal (PVT) system using water and nanofluid cooling medium

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Abstract

The electrical and thermal performance of an unglazed photovoltaic thermal (PVT) system integrated with a serpentine coil configured sheet and tube thermal absorber setup was evaluated using water and copper oxide-based nanofluid. An uncooled PVT system reached a maximum panel temperature of 68.4°C at noon and obtained an average electrical efficiency of 12.98%. Water and nanofluid cooling of the PVT system reduced the panel temperature by 15°C and 23.7°C at noontime, respectively. Compared to the uncooled PVT system, the average electrical efficiency of water and nanofluid cooled PVT system increased by 12.32% and 35.67% to obtain 14.58% and 17.61%,

Fabrication of a Flat Plate Photovoltaic Thermal Collector

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Abstract- A PV/T system is a hybrid system with a solar photovoltaic panel anda solar thermal collector that generate electrical and thermal energy simultaneously. The paper describes the fabrication of an Unglazed Flat Plate Collector system and experimentation of a Photo Voltaic/Thermal (PV/T) hybrid system.The photovoltaic/thermal (PVT) concept offers an opportunity to increase the overall efficiency of a PV module through the use of the waste heat generated in the PV module and subsequently cools the PV module.

Keywords – PV/T, Solar, Absorber, PUF

I. INTRODUCTION

The photovoltaic-thermal hybrid solar collector (or PV/T) is an equipment that integrates a photovoltaic (PV) module, for the conversion of solar energy into electrical energy, and a module with high thermal conversion efficiency, which employs a thermal fluid [1]. Most of the incoming solar energy is either reflected or absorbed as heat energy. Consequently, the working temperature of the solar cells increases considerably after prolonged operations and thereafter the cell's efficiency drops significantly. Unglazed collectors increases the electrical efficiency of the solar panel since the glazing is absent and thus reducing convective heat losses [2].Flat plate collectors are easy to manufacture and require low maintenance [3]. Flat plate collectors collect heat from both types of radiation-beam and diffuse.PV/T system is a type of co-generation system that produces power and heat from a single system by absorbing the waste heat from a solar panel [4].

When properly designed, PV/T systems can extract heat from PV modules, heating water or air to reduce the operating temperature of the PV modules and keep the electrical efficiency at a sufficient level [5]. A very recent example in this regard is studied where the performance assessment and comparison of two cascaded solar-assisted process heating systems have been presented,photovoltaic thermal (PVT) cascaded with flat-plate collector (PVT-FPC) and PVT coupled with heat pipe evacuated tube collector [6]. Solar thermal systems and solar PV systems have each advanced markedly, and combining the two technologies provides the opportunity for increased efficiency and expanded utilization of solar energy [7]. The current paper explains the fabrication of a flat plate photovoltaic thermal collector.

II. DESIGN AND FABRICATION OF THE SYSTEM

The fabrication of the system combines two technologies; a solar photo voltaic panel and a solar thermal collector that generate electrical and thermal energy simultaneously. The thermal collector made of rectangular copper pipes is configured as a Parallel-tube Flat-plate collector and is mounted to the reverse of a Poly crystalline PV panel. The collector pipes of rectangular shape helps in increasing the contact area between the pipes and PV panel, thus increasing the heat transfer. Each collector pipe is covered by insulation tape to reduce heat lose (Fig. 1). The PV/T collector, typically consists of a PV module on the back of which an absorber plate (a heat extraction device) is attached. PV modules convert solar radiation into electricity with peak efficiencies in the range of 5–20% [8]. The purpose of the absorber plate is two-fold. Firstly, to cool the PV module and thus to improve its electrical performance and secondly to collect the thermal energy produced, which would have otherwise been lost as heat to the environment. This collected

heat could be used, for low temperature applications such as domestic hot water production for showers and washing. Normally the electrical and the thermal performance of PV/T collectors is lower than that of separate PV panels and conventional thermal alone [9]. The photo voltaic thermal system consist of the combined flat plate collector and solar panel connected *via.* mechanical bonding. The specifications of the entire system is given in Table 1.

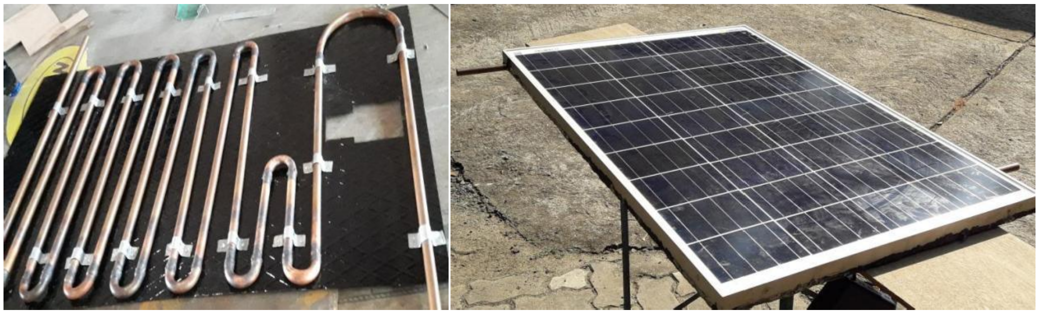


Figure 1. Collector pipes and solar panel

Table - 1 FPC-Flat Plate Collector specifications

Details	**Dimensions**
Length of absorber plate	103 cm
Width of absorber plate	63 cm
Thermal conductivity of plate material	210 W/mK
Absorber plate thickness	2 mm
Insulation material	Glass wool
Heating pipes specifications	0.625 cm dia., 6m length
Length of individual pipes	52.5 cm
Spacing between pipes	4 cm
Thickness of pipes	2 mm
U bend	0.625 cm dia.
Copper pipes loops	7 nos.
Total number of pipes	15
Insulation	PU Foam insulation
Adhesive	Epoxy aluminium paste
Thickness of adhesive	2 mm
Casing material	Aluminium
Dimensions of the casing	107 cm ×67 cm

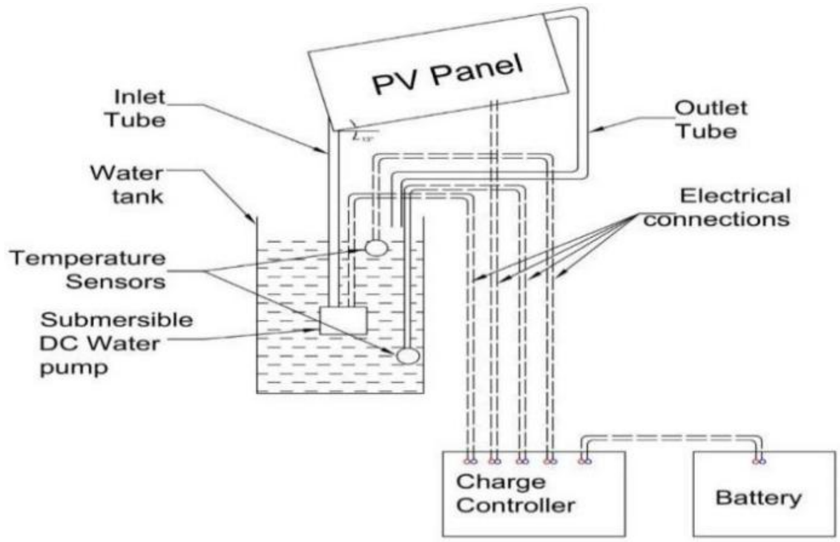
2.1 Fabrication procedure-

The aluminium sheet is cut based on the solar panel surface area and based on the positions where electrical connections are to be given. Both sides of the aluminium sheet are painted with black paint to increase absorptivity. Copper pipes are sized based on the length of the absorber plate and brazed with a U bend. They are then riveted to the aluminium sheet**.** The photo voltaic panel is connected to the absorber plate with the help of integration methods.

2.2 Integration methods-

Thermally conductive adhesives are the most widely used method in integration of PVlayer with the thermal absorber for all kinds of PV/T modules. Thermal characteristics include high thermal conductivity, extreme operating temperature range and good elongation properties, which improves the overall efficiency of the PV/T module greatly. This thermal adhesive integration method is a simple and cost effective one. In the present studies aluminium epoxy paste is used as adhesive. Epoxy adhesive is applied to fix the aluminium

sheet to the reverse side of the solar panel. Adhesive 'M-seal' is applied to the joints to prevent leakage of water. The entire system is closed and sealed with aluminium sheet (made in the form of an external casing). The PUF insulation is poured through the holes drilled in the casing and solid insulation is formed between the pipes.



2.3 *PV/T system and accessories-*

The systems comprises of storage tanks and temperature sensors, flexible hose (Figure 2). The water is stored in a tank connected to a DC pump in order to circulate the water. The temperature sensors are used to measure the temperature of the PV Panel, outlet hot water temperature and inlet cold water temperature.

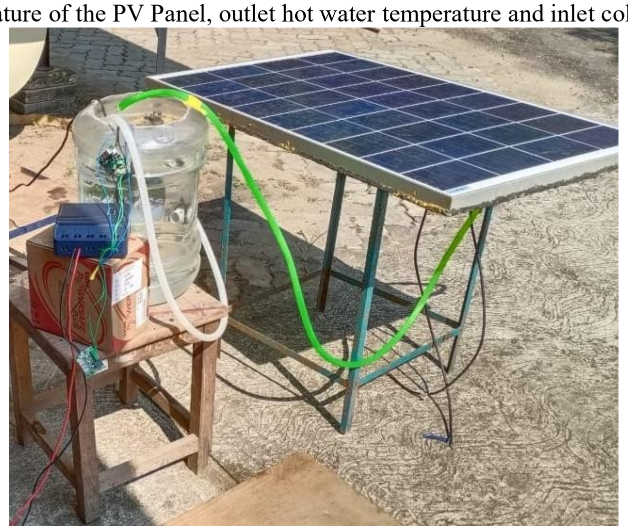


Figure 2. Fabricated PV/T system

2.4 *Specifications of the system-*

Solar Panel - Luminous Polycrystalline, Maximum power = 100 W, Open circuit voltage 22V, Short circuit current 6.06 A, Battery Luminous 110 Ah, Charge controller 6 A, 12 V.

2.5 *Material Selection Parameters-*

Absorber plate: Aluminium (High thermal conductivity, Light weight), Heating pipes: Copper pipes (Good heat transfer), Pipe bends (U bends), Black paint (To increase solar absorptivity), Insulation - PUF foam (High insulation capacity, good thickness, less air leakage), Casing - Aluminium (Less corrosive property).

III. EXPERIMENT AND RESULT

Photovoltaic technology is one of the finest ways to harness the solar power [10]. Photo voltaic thermal systems are co-generation systems that extract waste heat from the PV system. A PV/T system is a hybrid system with a solar photovoltaic panel and a solar thermal collector that generate electrical and thermal energy simultaneously. A review of literature suggests that most of the earlier research goals were twofold, that is to enhance the efficiency of the solar PV systems and to ensure a longer life at the same time [11]. Initially the PV system is tested for many days and it was found from the experimental values that as the open circuit voltage reduces at noon time and short circuit current increases at noon time since the temperature reduces and consequently the efficiency of the system reduces. In the present studies the fabrication of an unglazed Flat Plate Collector system was done for further experimentation of a Photo Voltaic/Thermal (PV/T) hybrid system. The future applications of photo voltaic technology will utilize the system technology available today and sub-system technology advances can be accommodated through minorsystem changes [12].

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Growth through repositioning – the case of IHCL

Shobha Menon

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CASE TEACHING NOTES

Abstract

Theoretical basis

This case highlights repositioning strategies that change a product's position in the minds of the consumer in response to changes in market conditions. These changes should be balanced with a certain amount of brand authenticity and continuity. Brand identity is the vision, core values and key beliefs of the brand. There are four main branding strategies as follows: house of brands, endorsed brands, sub-brands and branded house. These options can be placed in a continuum and the position on the branding relationship spectrum reflects the degree to which brands are separated in strategy execution and in the customer's minds.

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RESEARCH

Open Access

Identifying the potential role of curcumin analogues as anti-breast cancer agents; an in silico approach

N. G. Praseetha, U. K. Divya* and S. Nair

Abstract

Background: Breast cancer ranks top among newly reported cancer cases and most of the women suffers from breast cancer. Development of target therapy using phytochemicals with minimal side effects is trending in health care research. Phytochemicals targets complex multiple signalling events in cancer and are pleiotropic in nature. Thus, the present study was conducted to check the effectivity of curcumin analogues (Capsaicin, Chlorogenic acid, Ferulic acid, Zingerone, Gingerol) against the receptors that are expressed in breast cancer cells and prove its ethno-medicinal value by using bioinformatic tools and softwares like PDB, Patch Dock, PubChem, Chimera and My Presto.

Result: Out of the various curcumin analogues studied, Ferulic acid showed best binding affinity with all the breast cancer cell specific receptors (FGF, MMP9, RNRM1, TGF-beta, DHFR, VEGF and aromatase) which was confirmed through the docking studies.

Conclusion: The current work was a preliminary step towards screening suitable drug candidate against breast cancer using in silico methods. This information can be used further to carry out in vivo studies using selected natural analogues of curcumin as a suitable drug candidate against breast cancer saving time and cost.

Keywords: Curcumin analogues, Molecular docking, Ferulic acid, Breast cancer

Background

Cancer is the world's second leading cause of death. In the last 5 years, breast cancer had been diagnosed in 7.8 million women out of which Indian women are having higher breast cancer malignancy and less survival rate at the stage 3 or 4 of breast cancer [25]. Variety of therapies such as surgery, radiation, or chemo are used to treat cancer which will not always result in tumour reduction but can cause undesirable side effects such as nausea, drug resistance, cytotoxicity, relapse and lowering life quality, etc.

Target therapy is nowadays a promising method for developing anti-cancer drug where major proteins and receptors of cancer cells are promising targets and have been approved by the US Food and Drug Administration (FDA) [23]. The receptors such as Fibroblast Growth Factor (FGF), Matrix metallo proteinase 9 (MMP9), Ribonucleotide reductase subunit M1 (RNRM1), Transforming Growth Factor beta (TGF-β), Dihydrofolate Reductase (DHFR), Vascular Endothelial Growth Factor (VEGF) and aromatase are selected for the present study because all these receptors are getting expressed during breast cancer cell formation FGF plays roles in inflammation, Single nucleotide polymorphism (SNP), angiogenesis, proliferation etc. [33]. VEGF is involved in angiogenesis of cancer cells, while the epithelial mesenchymal transition is aided by TGF-β [13, 20]. Presences of aromatase have an unavoidable role in breast cancer development mainly in post-menopausal women [12]. DHFR and RNRm1 are essential for nucleotide synthesis in cancerous cells [15]. In addition to Matrix remodelling, and

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angiogenesis, cancer invasion and progression are aided by MMP9 [26]

Phytochemicals or their analogues are the potential source of medicinal compounds with less side effects [8, 28]. Phytochemicals from plants that are used as drug either directly or with slight modifications are known as “green drug” (E.g.: Curcumin, resveratrol, paclitaxel, and vincristine) [38]. Most of the G8 countries are involved in the green drugs research for cancer by spending ~ 1–3% of their Gross Domestic Product (GDP) [4].

Curcumin is a well-researched anti-cancer substance having a broad range of pharmacological and biological effects found in the rhizome of Curcuma longa L., a member of the zingiberaceae family [31]. Breast carcinoma, colon carcinoma, renal & basal cell carcinoma, T cell & acute myelogenous leukaemia, B cell lymphoma, melanoma, and prostate carcinoma are among the cancers that curcumin inhibits [19]. Bioavailability of curcumin is a major concern coming to clinical application. In order to overcome this, curcumin analogues can be used in cancer studies [27]. Curcumin analogues with higher bioavailability and wide spectrum pharmacological activity such as Capsaicin, Chlorogenic acid, Ferulic acid, Zingerone and Gingerol are selected here. Hence, in the present study, using bioinformatics tools, curcumin analogues were founded out and its effectiveness against breast cancer receptors and their ethno-medicinal usefulness were studied.

Unlike the studious and expensive wet laboratory experiments, the structure-based analysis is now easy with in silico technologies [10].

Methods

Selection and retrieval of receptors

Literature works were searched for potential anti-cancer targets [24]. Three-dimensional structure (in PDB format) of each of the seven selected receptors was retrieved from the protein data bank (PDB) using respective PDB ID (Aromatase: 3EQM, DHFR: 1DRF, FGF: 1QQL, MMP9: 1L6J, RNRM1: 4X3V, TGF-beta: 1TGK, VEGF: 1VPF).

Retrieval of ligands and screening

Pharmacologically active natural analogues of curcumin and established anti-cancer drugs which are used as controls were identified from previous literature works [14]. Structure of all the analogues was retrieved from PubChem compound database using PubChem ID (Capsaicin: 1,548,943, Chlorogenic acid: 1,794,427, Ferulic acid: 445,858, Gingerol: 442,793 and Zingerone: 31,211). 3D structure of control drugs used for the study was downloaded from Drug bank database using respective Drug bank ID (Pentosan polysulfate: DB00686, Proguanil: DB01131, Axitinib: DB06626, Galunisertib: DB11911, Marimastat: DB00786, Triapine: DB11940 and Testolactone: DB00894).

Molecular docking

PatchDock [30] was used which is based on geometry-based molecular docking algorithm. The potential complexes are sorted by shape complementarity criteria. Number of hydrogen bonds formed between the ligand and the receptor were determined by using chimera tool and the delta G values calculated using my Presto5 software [11]: [21]. Clustering RMSD—a positive number that specifies the radius of the RMSD clustering in angstroms. This value is used in the final clustering stage of the algorithm. It ensures that the distance between any two output solutions will be at least the specified clustering RMSD value. The default value for this parameter is 4 A°. Each receptor was docked against respective control drugs and all the five curcumin analogues used for the study.

Interactions of the receptor with ligand were analysed after molecular docking using chimera and my Presto5 software. Position of hydrogen bond formed between the ligand and receptor was identified using chimera software and marked using default options. Delta G value of the docked protein–ligand complex was analysed using my Presto Portal. Maximum negative delta G indicates higher binding affinity.

Determination of binding site

Active site or catalytic sites of each receptor were identified from the previous literature works [35]: [18]. This was done to find out the magnitude of interaction of receptor and ligand (by comparing the position of binding). Best were selected based on the position of H bond and free energy value of docked complex. In our study, during docking, the cofactors for the receptors DHFR, i.e. folate and for Aromatase, i.e. androstenedione were included. All other receptors do not have any cofactors.

Result

The work was done to screen important curcumin analogues depending on their hydrogen bond formation and delta G values. The best analogue will be used further for ADMET analysis and wet laboratory studies. The results obtained after patch dock analysis were studied with respect to following parameters: GSC score, AI area. The best were analysed using chimera to understand the hydrogen bond, and using my Presto 5 software, binding energy was predicted.

The following results were obtained for each receptor interaction with curcumin analogues and the control drug against each receptor.

Hydrogen bond formation and Delta G value obtained from the interaction of control with the receptor was taken as a standard to understand the interaction of other curcumin analogues (Fig. 1).

Control drug (pentosan polyslfate) formed 4 hydrogen bonds with FGF receptor. Out of the five analogues, chlorogenic acid formed three hydrogen bonds and ferulic acid formed two hydrogen bonds and Zingerone formed one hydrogen bond with the FGF receptor. Gingerol didn't form any H bond with the FGF receptor. Position of H bonds; LYS 194.A of ferulic acid and SER 113.A of chlorogenic acid are same as that of control. During the interaction with FGF receptor, the control liberates − 2.15 kcal/mol energy (Table.1). Among analogues, the highest energy is liberated by chlorogenic acid (− 1.74 kcal/mol), followed by Zingerone (− 1.08 kcal/mol) and ferulic acid (− 0.99 kcal/mol).

Marimastat (control) is capable of forming 6 H bonds with receptor MMP-9 (with A chain) (Fig. 2).

H bond formed by ferulic acid is at GLU 274.A; the nearest amino acid of SER.A 273 (formed by control). Chlorogenic acid formed three bonds with the receptor at Thr 245.A, SER 242.A. Gingerol formed one hydrogen bond at position Thr 426.A. On comparing the delta G values, control drug liberated − 3.57 kcal/mol, which is slightly lesser compared to the energy liberated by Ferulic acid (− 3.68 kcal/mol) (Table.1). Chlorogenic acid liberated − 3.02 kcal/mol energy. Also, gingerol and zingerone

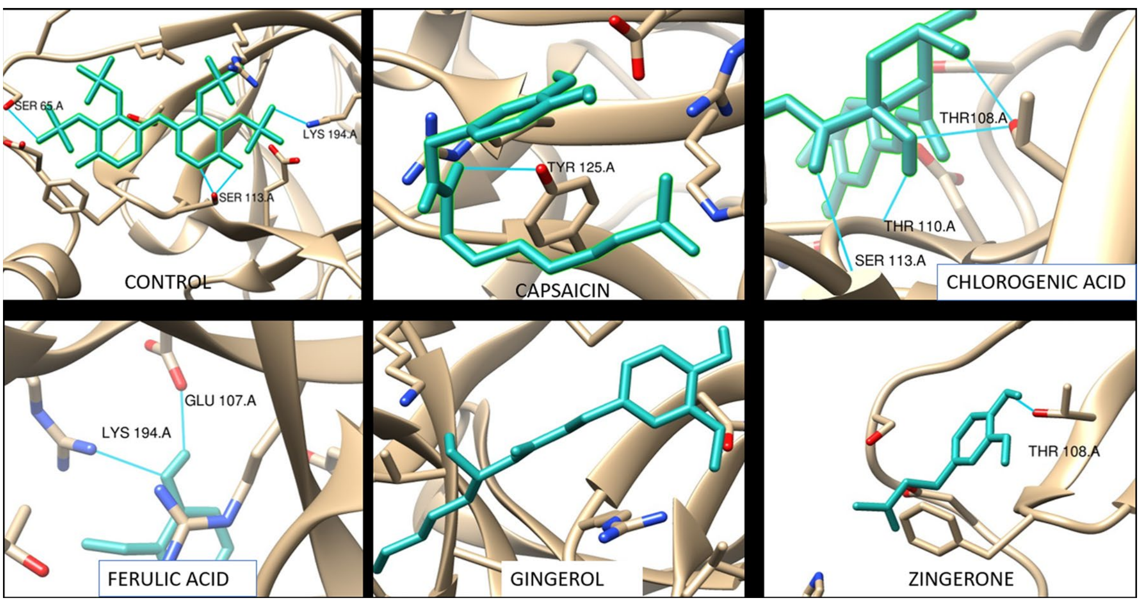

Fig. 1 Docked pictures of curcumin analogues and pentosan polysulfate (control) against FGF receptor. (Ligand represents the blue sticks, hydrogen bond interaction is represented in blue line, and receptor is represented in solid white ribbon form)

Table 1 Delta G value obtained from the molecular interaction of selected cancer receptors with respective control and curcumin analogues

Sl. No.	Ligand	Delta G (kcal/mol)						
		FGF	MMP9	RNRM1	TGF-β	VEGF	DHFR	Aromatase
1	Control	− 2.15	− 3.57	− 3.27	− 4.5	− 2.69	− 2.73	− 4.06
2	Capsaicin	0.08	− 0.63	− 0.02	0.48	1.87	− 0.03	0.15
3	Chlorogenic acid	− 1.74	− 3.02	− 2.07	− 0.99	− 2.01	− 1.54	− 2.12
4	Ferulic acid	− 0.99	− 3.68	− 2.81	− 1.19	− 1.54	− 1.68	− 2.46
5	Gingerol	− 0.42	− 1.99	− 0.73	0.09	0.71	− 1.21	− 0.16
6	Zingerone	− 1.08	− 1.91	− 2.13	− 1.07	− 0.86	0.36	− 1.51

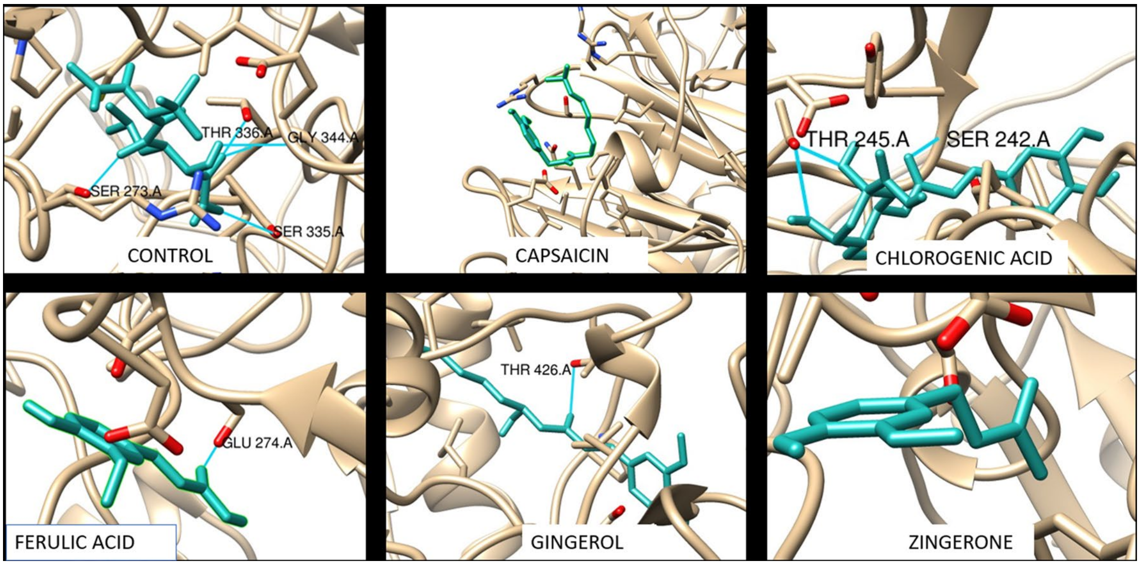

Fig. 2 Docked pictures of curcumin analogues and marimastat (control) against MMP-9 receptor. (Ligand represents the blue sticks, hydrogen bond interaction is represented in blue line, and receptor is represented in solid white ribbon form)

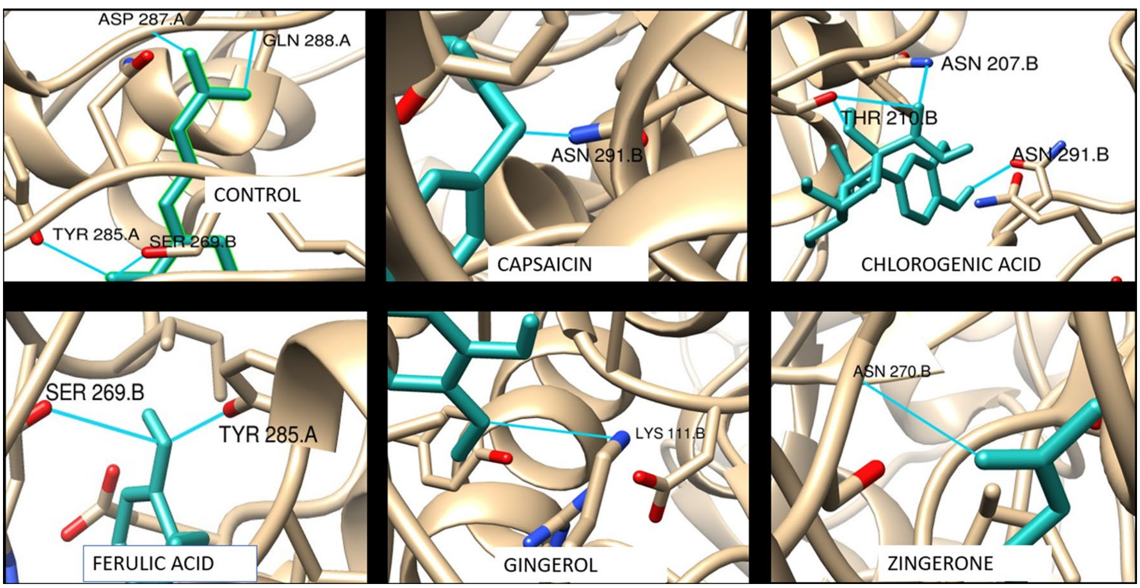

Fig. 3 Docked pictures of curcumin analogues and Triapine (control) against RNRM1 receptor. (Ligand represents the blue sticks, hydrogen bond interaction is represented in blue line, and receptor is represented in solid white ribbon form)

showed almost equal amount of delta G (− 1.9 kcal/mol). Least value was shown by capsaicin (Fig. 3).

Triapine (control) formed 4 H bonds at positions at ASP 287.A, GLN 288.A,TYR 285.A and SER 269.B with the receptor RNRM1. Ferulic acid formed two H bonds at positions SER 269.B and TYR 285.A same as the position of control. Single H bonds are formed by both gingerol and zingerone with the RNRM1 receptor. Chlorogenic acid formed 3 H bonds at different position ASN 207.B, THR 210.B, ASN 291.B. Ferulic acid liberated − 2.81 kcal/mol energy which is higher than the delta G of all other ligands studied except the control (− 3.27 kcal/mol) on interaction with the RNRM1 receptor (Table.1).

Galunisertib (control) formed a single H bond with the TGF- β receptor at position ASN 42.A and 1 H

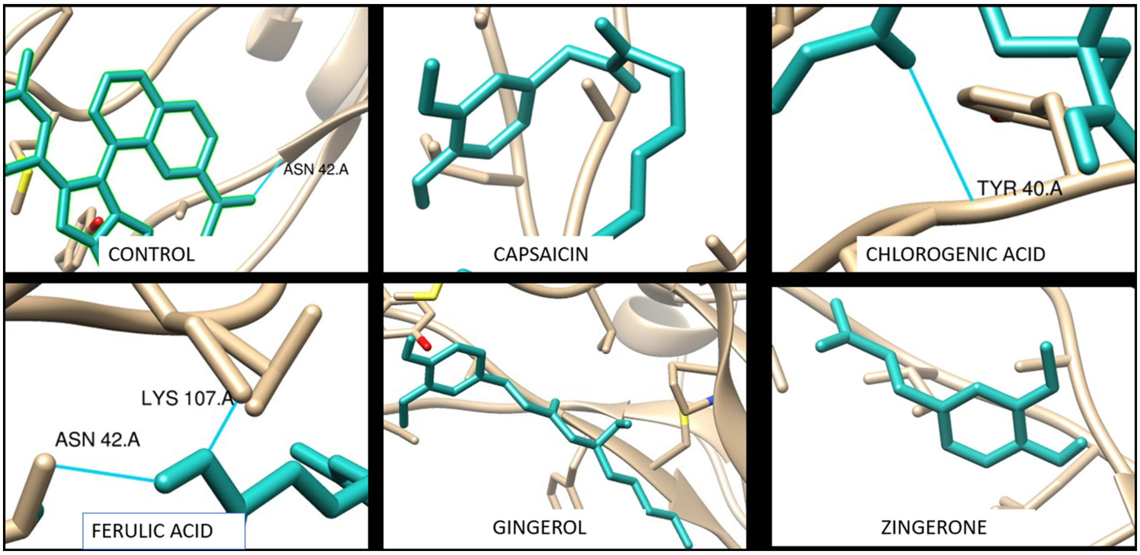

Fig. 4 Docked pictures of curcumin analogues and galunisertib (control) against TGF-β receptor. (Ligand represents the blue sticks, hydrogen bond interaction is represented in blue line, and receptor is represented in solid white ribbon form)

bond of ferulic acid also formed a single H bond at the same position of the receptor (Fig. 4). Chlorogenic acid formed a single H bond with the receptor at TYR 40.A. The remaining 3 ligands gingerol, capsaicin and zingerone didn't form any bond with the receptor. The curcumin analogues liberated less energy in a range of − 1.19–0.09 kcal/mol (Table.1) when docked with TGF-β receptor. Capsaicin has a positive value of delta G, i.e. 0.48 kcal/mol. Control had − 4.5 kcal/mol. In this case, ferulic acid showed better delta G values of − 1.19 kcal/mol.

Interacting with the VEGF receptor, control (Axitinib), ferulic acid, as well as chlorogenic acid, is forming bonds at same position that is CYS 61.A (Fig. 5). Control forms 2 H bond with the receptor, chlorogenic acid formed 3 H bonds and the remaining analogues formed

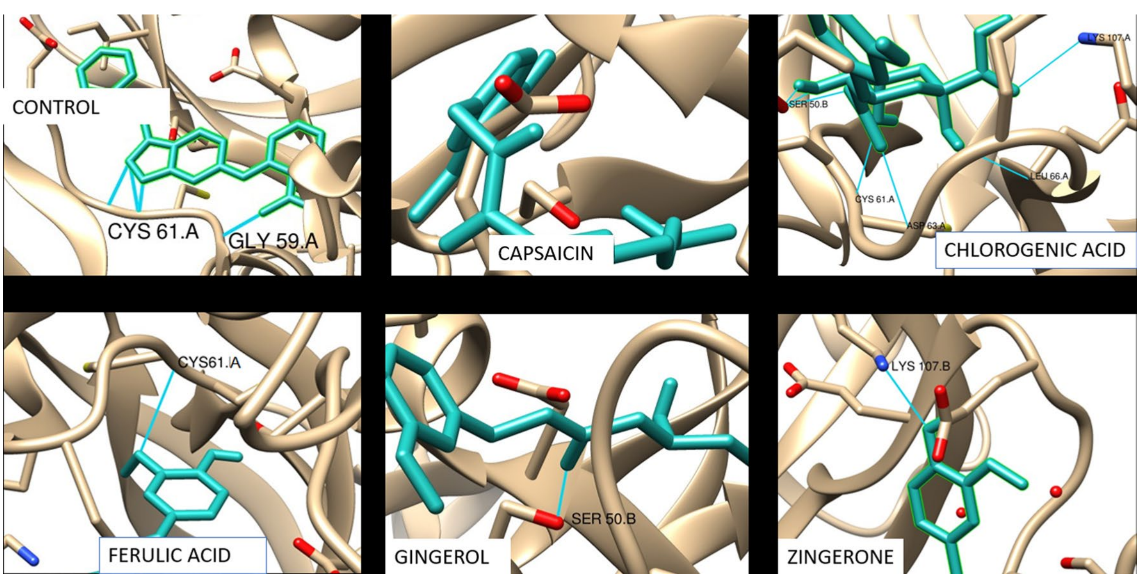

Fig. 5 Docked pictures of curcumin analogues and axitinib (control) against VEGF receptor. (Ligand represents the blue sticks, hydrogen bond interaction is represented in blue line, and receptor is represented in solid white ribbon form)

single H bond with the receptor. Here, the control Axitinib and Chlorogenic acid have almost similar range of delta G value, i.e. − 2.69 kcal/mol and − 2.01 kcal/mol, respectively (Table.1). Ferulic acid has a delta G value of − 1.54 kcal/mol. All the remaining analogues liberated a delta G greater than − 1 kcal/mol.

Two H bonds at ASP 22.A were formed by the control with the receptor DHFR(Fig. 6). Ferulic acid has also formed single H bond with the receptor at the same position (ASP 22.A) same as control. Zingerone and capsaicin are not forming H bonds with the receptor. Chlorogenic acid formed four hydrogen bonds with the receptor at SER 4.A, LYS 133.A, MET 58.A and ARG 37.A. Comparing the delta G values, Ferulic acid has more negative delta G (− 1.68 kcal/mol) followed by chlorogenic acid (− 1.54 kcal/mol) (Table.1). The Control liberated the maximum delta G (− 2.73 kcal/mol) among the studied compounds.

Control (testolactone) was found to form two H bonds with aromatase receptor at ASSN 136.A and SER 90.A. Similar bonds are formed by ferulic acid at SER 90.A and ASN 136.A with the receptor (Fig. 7). Capsaicin and zingerone didn't form any bonds. Chlorogenic acid formed single bond at TYR 361.A with the receptor. Gingerol formed bond with the receptor at position VAL 422.A. Control liberated − 4.06 kcal/mol energy which was the highest compared to other analogues (Table.1). Among the five analogues studied, a significant value of delta G was liberated by ferulic acid (2.46 kcal/mol) followed by chlorogenic acid (− 2.12 kcal/mol), respectively.

Binding affinity of ferulic acid only in case of MMP9 receptor is more compared to the control but in all other cases, the binding affinity of ferulic acid is less than the control. And on comparing with other curcumin analogues, the ferulic acid showed good binding affinity to all the receptors.

Discussion

Being the most prominent cancer among women, with high metastasis and less rate of survival, it is the need of the hour to develop potential drugs against breast cancer [37, 42]. From many reports, it has proven that curcumin analogues have anti-cancer activity and inhibit tumour growth by inducing apoptosis, preventing/reducing recurrence and also found to regulate intracellular components/pathways that control tumour growth [1, 7, 29].

From the five analogues of the curcumin studied, ferulic acid and chlorogenic acid showed promising results, based on the number of hydrogen bond formation and delta G values.

Hydrogen bonding is an exchange reaction whereby the hydrogen bond donors and acceptors of the free protein and ligand break their hydrogen bonds with water and form new ones in the protein–ligand complex [16].

The hydrogen bonds formed by the ferulic acid with all the receptor have screened ferulic acid as the best curcumin analogue compared with the other analysed analogues. In case of the docking study between ferulic acid and FGF receptor, the amino acid residues involved in hydrogen bond formation were Lysine, Serine, Glutamate, Tyrosine, Asparagine, Cysteine and

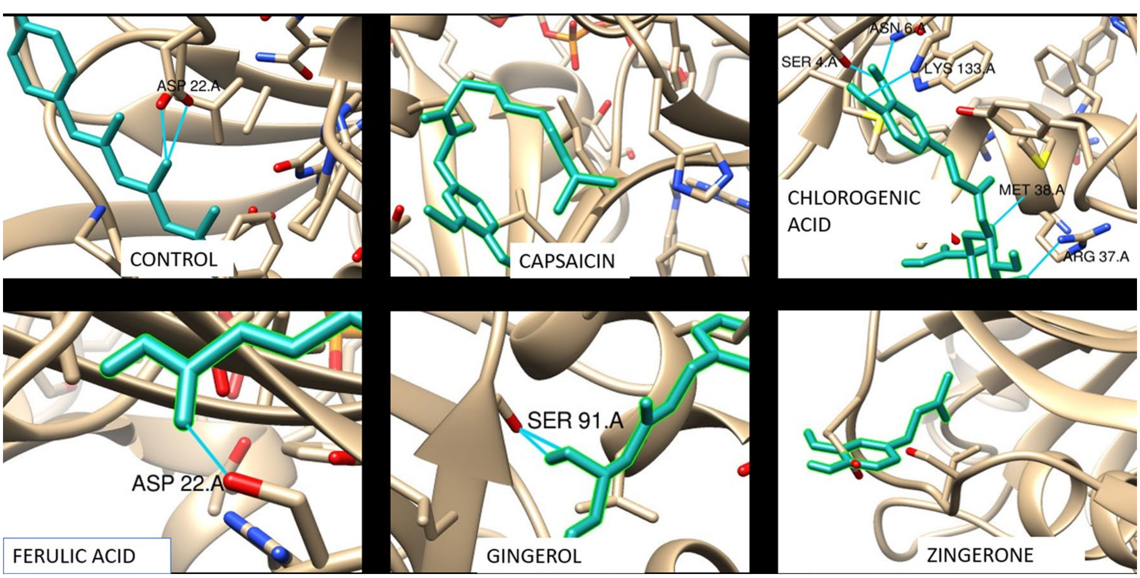

Fig. 6 Docked pictures of curcumin analogues and proguanil (control) against human DHFR receptor. (Ligand represents the blue sticks, hydrogen bond interaction is represented in blue line, and receptor is represented in solid white ribbon form)

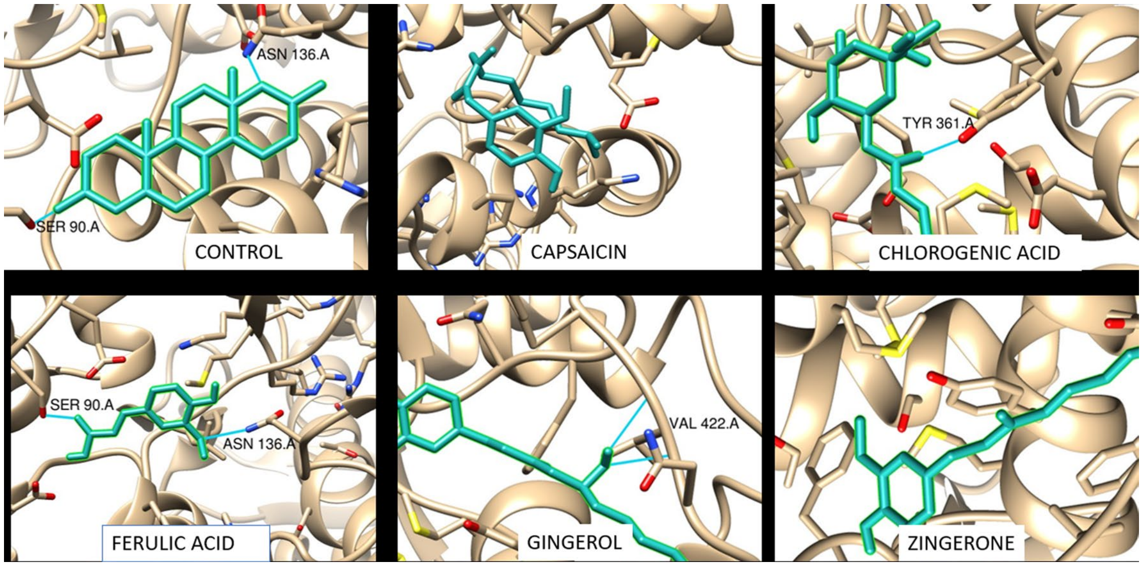

Fig. 7 Docked pictures of curcumin analogues and testolactone (control) against human aromatase receptor. (Ligand represents the blue sticks, hydrogen bond interaction is represented in blue line, receptor is represented in solid white ribbon form)

Asparatic acid. Except lysine, all other amino acids are non-essential. All these amino acids are capable of forming hydrogen bonds. Other types of interaction also occur like ionic bond formation due to the presence of asparatic acid and disulphide bond formed by cysteine residues. These residues do not match the amino acid residues which are present in the active site of all the seven receptors [17, 32, 34, 36, 40, 41], 2.

The reason for the non-matching of residues could be due to non-availability of X-ray structure of this receptors with natural substrate or other inhibitors. The presence of water molecules can also be a reason for the difference in the amino acid residues involved in the bond formation.

The water molecules were considered during the docking studies. Water has an important role in ligand binding thermodynamics [6], even in the environment of a lipophilic binding cavity [3]. Moreover, water related H-bonding networks have a significant influence in the structure–activity relationship [5] and optimizing the ligand taking into account the surrounding water network may result in enhanced binding affinity and prolonged residence time [22].

Compound that liberates highest negative delta G (or highest amount of free energy) is ideal for drug designing [9]. Binding free energy gives us the idea of strength and affinity of the interaction between the ligand and the receptor. The greater the binding free energy is, the weaker the interaction is and vice versa. Ligand which displayed least binding energy showed best affinity among the test molecules. Binding affinity determines that a high concentration of weakly interacting partners cannot replace the effect of a low concentration of the specific partner interacting with high affinity [39].

All these seven receptors get expressed during breast cancer cell development. Hence, ferulic acid can be a suitable drug candidate against breast cancer studies.

Conclusion

From the current study, it can be concluded that as Ferulic acid has better delta G value and position of binding with the active site of receptors, it is a better inhibitor for all the seven receptors studied. Further ADMET analysis is essential to study the pharmacokinetic properties of these compounds. As this is a preliminary stage of screening, further in vitro and in vivo studies are recommended to reinforce the therapeutic value.

Abbreviations

FGF: Fibroblast growth factor; MMP9: Matrix metallo proteinase 9; RNRM1: Ribonucleotide reductase subunit M1; TGF-β: Transforming growth factor beta; DHFR: Dihydrofolate reductase; VEGF: Vascular endothelial growth factor; ADMET: Absorption, distribution, metabolism, elimination, toxicity; H bond: Hydrogen bond.

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Author contributions
SN and DUK contributed to the study design, methodology, investigation, data analysis and wrote the first draft of the manuscript. PNG contributed to methodology, data analysis, validation and resources. All authors read and approved the final manuscript.

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Availability of data and materials
The data can be shared.

Declarations

Ethics approval and consent to participate
Not applicable.

Consent for publication
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Competing interests
The authors declare that they have no competing interests.

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Postcolonial Feminist Reading of Salwa Bakr's The Golden Chariot

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Postcolonial criticism is yet to approach contemporary Arab literatures seriously. A number of critics have grappled with the general representation of Arabs in Western media, which in turn construct the dominant discourses on Arabs and Arab nations. Edward Said, in *Orientalism*, argues that continuing Oriental tendencies from the West towards the Arab nations have led to the constitution of the Arab as the Other of present times (26-28). This Orientalist approach subtly conceals the role of the European colonial enterprise in the history of the Arab nations and their neo-colonizing presence, which solidifies their power and dominance over the latter to this day. It is thus no wonder that the literatures from these nations are not studied under the auspices of Postcolonial literature. The other reason for this ignorance is that much of these literatures are written in Arabic, unlike India or Africa, where English language literary works are written aplenty. Translations further slacken the processes of interpretation and criticism.

Particularly, Arab women writers have gathered the least scholarly attention and few criticisms move beyond appreciating their works for their very existence. The same holds true for well-known writers. For example, the literary techniques, style, significance, social or political commentary in Nawal el Saadawi's works are rarely touched upon. This refusal to go further than appreciative criticism furthers the image of the

'Arab woman' as a poor creature kept under the supposedly grand Islamic patriarchy. Chandra Talpade Mohanty, in her essay *Under Western Eyes: Feminist Scholarships and Colonial Discourses,* questions the inherent racism in majority of the feminist works from the West. Two of her major propositions are applicable to the study of Arab women writers. She opines that many Western feminist works stereotype the average Third World Woman as uneducated, abused and oppressed mother-of-many. She also points out the persisting links between the First world and Third world economies, alongside such stereotyping and the resultant consequences of these connections.

These acts of de-historicization and decontextualization are much more evident in the case of Arab women. Arab women writers of fiction such as Nawal el Saadawi, Latifa al Zayyat (Egypt), Sahar Khalifeh (Palestine) and Hoda Barakat (Lebanon), to name a few prominent ones, break the stereotypes surrounding Arab women and portray the women of their respective nations as distinctive personalities, affected by their particular circumstances. They also deal with the corruption and inequalities in their societies and the permeating Western influence in them. Postcolonial feminism argues demands particularity in women's stories and study the historical, social and cultural contexts of the literary work. This paper analyzes the novel The Golden Chariot by Salwa Bakr, as translated by Dinah Manisty, within Mohanty's framework of Postcolonial feminism, in an attempt to bring out the above said concerns in it.

Salwa Bakr is an established Egyptian writer of novels and short stories. Two of her novels and several of her short stories have been translated into English. *The Golden Chariot* is representative of the writer's witty, personal and colloquial style of writing. The novel brings together the stories of many women, who are the inmates of a women's prison in Egypt. The novel is situated in the Egypt of the 1980's where women's crimes were reported to be on the rise and the perpetuators were branded as evil and un-womanly. The book is an ironic reply to these accusations, as the author looks into why and how these crimes actually happened. Fadia Faqir, in her introduction to the book, says that the form of the narrative is similar to that of *Arabian Nights*, where the character Scheherazade brings structural unity through her narration. Aziza, the Alexandrian woman of questionable sanity, serves the role of the narrator bringing in her opinions and judgments on each of the prisoner and their connection to the world outside the prison walls. The omniscient narrator weaves in the social commentary between Aziza's version of events and the actual reality. Aziza's upper class status also brings to light the differences in consciousness and reality of the lower, middle and upper class women.

Images offer clarity into the ambiguousness of justice and the situations of the characters. The first image is that of the prison. The prison stands for the oppressive lives that the women inside are put in and yet it signifies freedom from the social norms and household activities that these women are used to in daily life. Anastasia Valassapoulos in her book *Contemporary Arab Women Writers: Cultural Expression in Context* is skeptical of the view that the prison narrative gives a voice to the voiceless and enables the text to express gender issues that are avoided by the law (103). She states that the women's place in the prison prevents the politicization of the very issues they seek to represent. The narrative takes the view that these crimes are unavoidable and they do seem to be. The acts that these women commit to handle situations speak out their rebellion against their dictated roles, yet these acts land them in prison, effectively silencing them. These acts seem to stem from desperation and while it frees the minds of some, it binds many to shame or passive acceptance of justice.

Madness is another image that runs through the text frequently and it provides the fantastic element in the text. Aziza has been imprisoned for murdering her stepfather, who was her lover too. Her blind aristocratic mother was able to remarry, because she was a woman of beauty and fortune. The much-younger husband had a well-paying government job and was a secret philanderer. He seduced the child at young age, telling beauteous phrases, taking her on trips and showering her with gifts. The young Aziza was charmed by his claims of love and kept in tow by his taking a father/lover position, preventing her from an equal-age love or marriage. Her mother never saw the passions between the child and the stepfather and eventually died, leaving the two lovers alone. Aziza saw her world collapse only when the stepfather decided to remarry and she murdered him. She sits in her lonely cell ruminating over her past every night, sipping imaginary wine and talks to the spiders in her company. Her guilt on not telling her mother the truth pursues her and she longs for her former life. She feels that she killed the destroyer that her step-father was and still loves his other self, i.e. of the passionate lover. Her imagination aids her in her madness and is reflected in the creative ways that she wanted to kill him. It also aides her to imagine that a great golden chariot would carry her and others chosen by her to heaven. Ironically, she imagines the takeoff to happen exactly in the moments before her death.

Aida, a girl from the one of the villages, is found in a bad state one day by Umm-Khayr, a peaceful and motherly woman, who came to the prison to save her son from this fate. "…found Aida sitting in front of a basin staring vacantly and making the noise of a bitch wailing. She was gnawing a piece of dark prison soap with a degree of violence that expressed the pain felt by a bitch expelling a litter of seven puppies from her womb"(65). Umm-Khayr pulls the soap of Aida's mouth and makes her tell out her story. Aida was from a poor family and she was married off to a middle-class man by her greedy mother. The husband was dominative and abusive and Aida could not break away from him. Aida's only companion was her brother and his opinion was discarded by their parents while accepting this marriage proposal. One day, when the family arrived at Aida's home, her brother found that she was beaten and a fight broke out between him and Aida's husband. The brother mistakenly murdered the husband in self-defense, when the latter tried to kill him. The cunning mother made Aida take the blame, stating that the husband's family would kill the brother in revenge if the truth came out. Aida came to prison freed from the husband and hoped to hear from her brother. The news of his untimely death pushed her to swallow the soap and scream. Although Aida's helplessness is understandable, the powerlessness of both the sister and the brother stands out. The dominative mother, educated husband and laws of justice and marriage wield power and the siblings are rendered incapacitated. The brother's brave step does not bring him happiness.

The educational policies of the Egyptian government and the unfathomable divide between the rich and the poor is much commented upon through the character's situations and choices. Azima, named as the giant of the prison owing to her extraordinary height, failed to her primary examinations like many of her fellow classmates. Though free education was provided for by the Egyptian leader Abdal Nasser, the quality of it was abysmally low. Azima used her imagination and flair for language to become a professional mourner and later became a singer of religious verses on the radio. Inspite of her lack of education and extraordinary height that made her a non-prospect for marriage, she was able to attain prosperity. Another inmate was Bahiga Abdel Haqq, a poor and hardworking doctor who was imprisoned for administering the wrong dose of anesthetic that lead to the death of a child. The dry humor of the writer is exemplified in a passage, where it is said that the death of infants was a common occurrence and that the Egyptians could keep reproducing to stay alive as a people. Bahiga, the daughter of a watchman, worked hard to get to medical college but she had to compete with the children of wealthy parents there. Her fragile self-identity is shattered by a lover who deserts her for a rich girl. The 1980's was the time when many of the men from all Arab states looked towards the oil states for sources of income. This gave rise to a predominantly rich class of people, who could afford the best brands and give their children a wealthy lifestyle. Students like Bahiga could not attain what is given as the three c's of the medical profession: a car, a clinic and a country house.

> The real cause of Bahiga's schizophrenia was the desire to find her place in the small pyramid she carried inside her, just like everyone else, which acts as the gauge by which the individual defines his identity, seeking the esteem and respect of all those above him in the pyramid and scorning all those beneath him (113).

The open-door economic policy of the early Nasser era also allowed for luxurious hospitals to come up and private clinics mushroomed all over Egypt, while the government hospitals saw no improvement and the poor were left to die on the doorstep of these huge hospitals. Another jibe at the economic policy of the state comes from the story of Umm-Ragab and Jamalat, the pickpockets. Aziza sees the former's head as a rotten melon with decayed skin and a putrid smell. The uneducated Umm-Ragab was pushed to thieving because her husband divorced her with a little one to feed. It is a typical story of a victim, but she is not a woman of less spirit. She once kicked out a beggar with whom she hoped to give birth to a son, when he took in another child. She serves as a spy at the prison by flattering the wardens, scares away most people and had married her daughter off with her earnings. Only when she hears of her daughter's death in a gas explosion and her newly-orphaned grand-children she gets a heart attack. Jamalat came from a family of pickpockets, and yet ironically she was imprisoned for accidentally murdering a lusty suitor of her sister. The existence of endless pickpocket gangs, procurers for prostitution and open drug trade point to the failure of the government's economic policies. Foreign players were freely allowed in trade and they invested in factories for import and export. These factories manufactured products for Egyptian consumption and gave much profit for the capitalists and temporary jobs for the poor, but drained the country's economy. These factories later had to shut down when Nasser nationalized them. The consumerist economy created by these factories drove poor and middle-class families to buy more than what they needed, an example for which is Safiyya, who sold drugs inorder meet the increasing demands of her family.

The discovery of the tomb of the pharaoh Tutankhamun in 1922 by British archeologist Howard Carter opened a new chapter in Egypt's history. Egyptian history was being rewritten by the Britishers and they were discovered to have been an ancient civilization, as more tombs of ancient royal personas were unearthed. In *The Golden Chariot*, the writer portrays a dramatic increase in the class of middlemen, who catered to the rising tourism industry, assumedly fuelled by the interest in the Orient's ancient history and developing modes of transport. With a lack of job opportunities inside the country, a number of men took to opening tourist agencies, small businesses and other such related jobs. One such man in the story, who became middle-aged by the time he was rich, attempted to court Shafiqa's sister. Shafiqa is another mad inmate of the prison. Such a man was held as eligible marriageable material by the surrounding middle-class families as young men of the time were either jobless, did menial jobs, dead in the war or gone to the oil states. This middle-aged man's pride was offended by the widow's rejection of him over another lover, and he reported it to the conservative father. The father and brother killed the young woman to salvage their pride, as it was a crime to consort with a man of another religion. This had propelled the kind-hearted Shafiqa to madness, begging and imprisonment for the same.

To conclude, *The Golden Chariot* is a string of stories that tells of the lives of women of all classes of the late 20th century Egypt, with humor, pathos, pun and irony. While many of the characters are exploited by men and they end up living miserable lives, the rich young woman is somewhat better than her poorer counterpart, though she would face problems of her own. The political prisoner who hailed from a wealthy family gets out of prison sooner and her fate is contrasted with that of the rest. The young men of middle-class and poor families fare no better. They scrape through life to somehow find a means of living. Various references to the lack of young marriageable men points to the lack of opportunities at the time for educated young men; the rise of Islamic fundamentalism and its attraction for young men with no opportunities is not spoken of in this book; other Egyptian writers such as Alaa al Aswani and Naguib Mahfouz have greatly expanded on the subject. Crimes compound in a society that provides almost no jobs and women are the worst affected in such a state. The poor such as Umm-Ragab, Jamalat and Huda, the prostitute, are left to fend for themselves without the support of men. Thus, the novel expounds the lives of Egyptian women in the 1980's, especially those from the poor and the middle-class, as affected by traditions, marriage practices, the failing economy, corruption, failed governmental policies and Western capitalist interventions. The stereotype of the average Third World Woman or the veiled Arab woman has no place in the novel as it refuses it categorically; each woman is seen as a product of her circumstances and each one rebels against them in her own way. These feminist, social and Postcolonial concerns of the writer are reflective of Arab women writers in general, who handle oppression in both private and public spaces in equal measure. Postcolonial feminist criticism opens up new avenues to study these writers and fill the knowledge gap that exists in contemporary criticism on Arab literature.

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PRICE CONSCIOUSNESS AND COGNITIVE DISSONANCE: CUES FROM GEN Z

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PRICE CONSCIOUSNESS AND COGNITIVE DISSONANCE: CUES FROM GEN Z

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ABSTRACT

The pandemic has brought remarkable changes to many enterprises. The pandemic driven decline in consumer spending was visible at the start of 2020. However, it is entirely exceptional to note that retail is one industry that is enjoying high resilience and predicted to achieve the pre-pandemic trajectory level rapidly. The e-commerce growth has revamped the retail landscape by adding tons of new digital buyers to its consumer base. The present study is an attempt to assess the relationship between price consciousness and cognitive dissonance among Generation Z consumers while purchasing apparels. Results revealed that Gen Z are highly price conscious. The findings from Correlation indicate that there is a significant relationship between price consciousness and cognitive dissonance among this cohort selected for the study.

KEYWORDS

Generation Z, Cognitive dissonance, Phygital, Physical store, Online purchase, Offline purchase

1.Introduction

Retail is one industry which is receiving a persistent growth defying all odds. COVID-19 has led to sweeping changes in all sectors. Retail is not an exception to this. The striking transformation in the purchasing practice, the channel mixes and the business models that were afoot before pandemic is becoming stressed at a hotter pace. The borderline between brick and mortar outlets and virtual stores is thinning rapidly. The vendors are seeking to adapt to platform business, which is now controlling the physical outlet sales. Those sellers who can instantly readjust to counteract the disruption, can remain competitive. Thus, every retailer, either nationwide or global, is in the foray to alter from the physical formats to that of platform-based business. Covid-19 has accentuated the pace of shift and being digital is now the standard which may prevail in the years to come.

2. The Background

Growth of E-Commerce: Every enterprise in the world has witnessed its entire market shape up with contemporary norms. The advance in e-commerce was sustained by a surge in internet users, the use of smartphones, and a digitalized modern lifestyle. This is apparent in the data in which e-retail sales surpassed 4.2 trillion U.S dollars worldwide in 2020. The e-commerce share is predicted to reach 21.8% of the overall global retail sales in 2024. According to Grant Thornton, e-commerce in India is expected to be worth US$188 billion by 2025.

Generation Z: According to McKinsey & Company, Generation Z are those who were born between 1995 to 2010. McKinsey, in their report (2020) on the prospect of shopping of generation Z, has declared that these youths are reformulating the rules of shopping behaviour. The report said that Gen Z is prone to shop across both types of channels all the time. They browse online and identify a product which they prefer to purchase from a store for fun and enjoy the experience. The same perception is restored by the study conducted by Airtel Business Customer Advisory Board in their observations, which brought to light how consumers are pushing the retailers to foray into “Phygital” world, where both the physical and digital world are completely interconnected.

Apparel industry: In 2020, the Indian e-commerce sales rose by 7% and have reached US$46.20 billion. It is noteworthy to mention that despite the Covid–19 challenges, the Indian e-commerce market continues to grow at 5%, with expected sales of US$56.6 billion in 2021. Having this at the backdrop, the organized retail is having a steady growth year on year with fashion/ apparel and grocery likely to be the key drivers of incremental growth. The online penetration of retail is expected to reach 10.7% by 2024 compared with 4.7% in 2019.

Price Consciousness: Lichtenstein et al., (1993) in their article has referred to price consciousness as to the degree to which the customer focuses only on paying low prices.

Cognitive dissonance: Festinger (1957) described cognitive dissonance as a psychologically uncomfortable state. The concept of dissonance had been comprehended and applied in a multitude of domains; found widely used its application in consumer behaviour in marketing.

2.1 Study rationale: As per the survey conducted by Deloitte, it is observed that different sub sectors of retail performed differently during 2020. Grocers, home improvement etc., got categorised as essentials and expected to have an aggressive revenue growth in 2021. Whereas apparels, and department stores seemed to struggle from the onset of the pandemic. It is thus a once–in–a lifetime opportunity for these companies to evolve and transform their business and thus rewrite the rules of the industry. The present paper provides useful insights into the consumers' post purchase behaviour of apparels in both online & offline mode and how the retailers could lure the young generation and remain competitive. This paper could bring in revelations which can reduce the considerable level of ambiguity still prevailing among the retailers regarding the way forward.

2.2 Study objectives

1. To compare the level of cognitive dissonance of consumers in online and offline purchase of apparels
2. To study the influence of price consciousness on cognitive dissonance of online & offline purchases of apparels.

3. Literature review

Compared to traditional purchases, the temporal gap between the purchase, the delivery and the consumption of products for online purchases is a challenge for e-sellers. A mismatch of expectations and consumption experiences causes a stronger post-consumption dissonance for online purchases. Cognitive and affective components of post-consumption dissonance have a positive influence on negative emotions, a combination of anger, regret, and guilt. Additionally, the evoked negative emotions are found to be lower for the elderly and female consumers (Mahapatra, S., & Mishra A., 2021).

The acceptance of online shopping as technology is based on perceived usefulness and ease of use of technology. The study finds that both Perceived usefulness and perceived ease of use dimensions have increased customer acceptance of online shopping.. These dimensions are very strong and play a significant role in reducing post purchase dissonance of the customers. It has been found that there is no difference in the post purchase dissonance of the customers across gender. While there is a significant difference in the post purchase dissonance across age groups, specially between youth of age group 17-20 years and 25 and above years. (TomarRS et al., 2021)

Understanding consumer's post-purchase psychological state by examining the influence of sales promotion and emotional brand attachment on post-purchase cognitive dissonance, by taking into account the mediating role of impulse buying behavior. The statistical findings of this study show that sales promotion has a significant positive effect on post-purchase cognitive dissonance. Furthermore, results indicate that emotional brand attachment has a significant positive impact on post-purchase cognitive dissonance. The moderating role of Gender describes that the positive relationship between sales promotion and post-purchase cognitive dissonance will be stronger for women as compared to men at a higher level of sales promotion. (Akbar, M I U D et al., 2020)

The Cognitive Dissonance Theory (CDT) was used to investigate the effects of internal and external factors on consumers' shopping behaviour, as well as to explore how consumers overcome post-purchase regret of online impulse buying. The findings indicate that Impulse buying positively influenced post-purchase regret. Marketers in online shopping platforms can manage negative cognitive dissonance by including a message in their advertising that compliment customers' wisdom, offer long warranties or satisfaction guarantees, provide detailed information on how to use the product correctly, and improve the overall effectiveness of online services. (Lazim, N A M et al., 2020)

An investigation of Cognitive dissonance experienced occasionally right after an online shopping experience and the factors leading to cognitive dissonance. The results have indicated that the independent variables "Hedonic Consumption" and "Reference Group Effect" have a significant effect on "Cognitive Dissonance" - dependent variable. "Hedonic Consumption" is the most effective independent variable on "Cognitive Dissonance". (Mustafa &Kocamaz 2019)

4. Methodology

The age group belonging to 18-25 were treated as the population of the study. A structured questionnaire was developed based on the literature findings and the approved scales were used to gauge the price consciousness and cognitive dissonance. The scale developed by Lichtenstein et al.,(1993) and Sweeney et al.,(2000) were used for measuring price consciousness and cognitive dissonance respectively. The responses were collected from 146 respondents by simple random sampling. The inclusion criteria was that they should have purchased apparels in both online and offline mode.

5. Analysis

The quality of the data has been validated by verification of missing values and outliers. Chronbach Alpha was estimated for all items and values between 0.6 and 0.8 confirmed the appropriateness of the study variables. Table 1 gives the reliability of the measures considered and was found to be more than the desired level.

Table 1: Values of reliability coefficient of variables considered

Variables	Chronbach's Alpha
Price consciousness in online purchase	0.694
Price consciousness in offline purchase	0.591
Cognitive dissonance of online purchase	0.722
Cognitive dissonance of offline purchase	0.843

Source : Primary Data

Table 2: Characteristics of participants in the study

Characteristics	Group	Number (N=146)	Percentage
Gender	Male Female	68 78	47 53
Employment status	Employed Not Employed Partly Employed Self Employed Student	19 8 2 2 115	13 6 1 1 79
Domicile	Rural Urban Metropolitan	34 80 32	23 55 22
Purchase Frequency	Weekly Occasionally Monthly Fortnightly	11 95 32 8	8 65 22 5

Source : Primary Data

5.1 Influence of demographic characteristics on behavioral variables

This study has been aimed to get deeper insights into the purchase and post-purchase behavior of consumers who are buying apparel online based on their demographic factor, namely gender.
To identify whether the price consciousness and cognitive dissonance vary among male and female respondents, an independent sample t-test has been carried out, with the following hypothesis and the result is shown in table 3.
H_0: There is no significant difference among gender in terms of price consciousness and cognitive dissonance
H1: there is a significant difference among gender in terms of price consciousness and cognitive dissonance

Table 3: Independent Samples t Test

Independent Samples Test										
Levene's Test for Equality of Variances										
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Diff.	95% Confidence Interval of the Difference	
									Lower	Upper
PC_ONLIN	Equal var. assumed	0.09	0.76	1.66	144	0.09	0.177	0.107	-0.033	0.389
	Equal var. not assumed			1.66	141.7	0.09	0.177	0.107	-0.033	0.389
PC_OFFLIN	Equal var. assumed	0.269	0.604	0.52	144	0.601	0.069	0.1329	-0.193	0.3325
	Equal var. not assumed			0.52	138.4	0.602	0.069	0.1335	-0.194	0.3337
CD_ONLIN	Equal var. assumed	2.77	0.098	0.56	144	0.57	0.064	0.1133	-0.16	0.2881
	Equal var. not assumed			0.57	143.6	0.56	0.064	0.1119	-0.157	0.2852
CD_OFFLIN	Equal var. assumed	1.274	0.261	0.05	144	0.95	0.007	0.1262	-0.242	0.256
	Equal var. not assumed			0.05	136.7	0.95	0.007	0.127	-0.243	0.2586

Source : Primary Data

From the above table, it can be observed that the ***p*** value of Levene's test for Equality of Variances for online price consciousness (0.763), offline price consciousness (0.604), cognitive dissonance of online purchase (0.098), and cognitive dissonance of offline purchase (0.261) are greater than the chosen significance level 0.05, indicating that the requirement of homogeneity of variance has been met and fail to accept the alternate hypothesis.
The test results conclude that both male and female respondents do not differ in terms of price consciousness and cognitive dissonance.

5.2: To study the level of price consciousness

To understand the level of price consciousness of Gen Z members in online and off-line purchase of apparels, t-test has been carried out with the following hypothesis:

H_0 : Price consciousness is low among Gen Z consumers
H_1 : Price consciousness is high among Gen Z consumers

Table 4: One-Sample Statistics

Test Value = 3									
	Mean	Std. Deviation	Std. Error Mean	t	Df	Sig. (2-tailed)	Mean Diff.	95% Conf.Interval of the Difference Lower Upper	
CD_ONLINE	3.4726	0.6496	0.0538	8.791	145	0	0.4726	0.3663	0.5789
CD_OFFLINE	3.1318	0.7994	0.0662	1.993	145	0.048	0.1319	0.0011	0.2626

The result of a one-sample t-test to determine the level of PC_ONLINE and PC_OFFLINE among the respondents was different to normal, with a defined awareness score of 3.0. The mean score for PC_ONLINE is 3.4726, and PC_OFFLINE is 3.1318, and are greater than the normal score of 3.0, statistically significant at p = 0.000 and p = 0.048 respectively. Therefore, the t test result reveals that Gen Z'ers are highly price conscious for both online and offline mode of purchase.

5.3 To identify the level of Cognitive dissonance

H_0 : Cognitive dissonance is low among Gen Z consumers
H_1 : Cognitive dissonance is high among Gen Z consumers

Table 5: One-Sample Statistics

Test Value = 3									
	Mean	Std. Deviation	Std. Error Mean	t	Df	Sig. (2-tailed)	Mean Diff.	95% Conf.Interval of the Difference Lower Upper	
CD_ONLINE	2.7901	0.6818	0.0564	-3.72	145	0	-0.2099	-0.3215	-0.0984
CD_OFFLINE	2.5983	0.7584	0.0628	-6.4	145	0	-0.4017	-0.5258	-0.2777

A one-sample t-test was run to determine the level of CD_ONLINE and CD_OFFLINE among the respondents was different to normal, with a defined awareness score of 3.0. The mean score for CD_ONLINE is 2.7901, and PC_OFFLINE is 2.598, and is lower than the normal score of 3.0, statistically significant at p = 0.000. Therefore, the t test result reveals that Gen Z'ers experience less cognitive dissonance for both online and offline mode of purchase.

5.4 To assess the relationship between price consciousness and cognitive dissonance - online purchase

To identify the relationship between "price consciousness" and "cognitive dissonance" associated with online purchase, a correlation analysis has been carried out with the following hypothesis:

H_0 : There is no significant relationship between price consciousness and cognitive dissonance in online purchase

H_1 : There is a significant relationship between price consciousness and cognitive dissonance associated in online purchase

The Pearson Correlation technique seems to be adequate to evaluate the relationship between these two variables and the result is exhibited in table 6.

Table 6: Correlation between price consciousness and cognitive dissonance in online purchase

		PC_ONLINE	CD_ONLINE
PC_ONLINE	Pearson Correlation	1	-.191*
	Sig. (2-tailed)		.021
	N	146	146
CD_ONLINE	Pearson Correlation	-.191*	1
	Sig. (2-tailed)	.021	
	N	146	146
*. Correlation is significant at the 0.05 level (2-tailed).			

The result in table 6 reveals that there exists a significant relationship between price consciousness of online purchase and cognitive dissonance. These results indicate that any increase or decrease in price consciousness do significantly relate to increases or decreases in cognitive dissonance. Price consciousness of online purchase has a statistically significant negative linear relationship with online cognitive dissonance (r= -0.191., at p < .021).

5.5 To assess the relationship between price consciousness and cognitive dissonance - offline purchase

To identify the relationship between "price consciousness" and "cognitive dissonance" associated with offline purchase, a correlation analysis has been carried out with the following hypothesis:

H_0 : There is no significant relationship between price consciousness and cognitive dissonance associated with offline purchase.

H_1 : There is a significant relationship between price consciousness and cognitive dissonance associated with offline purchase.

Table 7: Correlation between price consciousness and cognitive dissonance in offline purchase

		PC_OFFLINE	CD_OFFLINE
PC_OFFLINE	Pearson Correlation	1	-.168*
	Sig. (2-tailed)		.042
	N	146	146
CD_OFFLINE	Pearson Correlation	-.168*	1
	Sig. (2-tailed)	.042	
	N	146	146
*. Correlation is significant at the 0.05 level (2-tailed).			

The result in table 7 reveals that there exists a significant relationship between price consciousness of offline purchase and cognitive dissonance. This indicates that any increase or decrease in price consciousness do significantly relate to increases or decreases in cognitive dissonance. Price consciousness of offline purchase have a statistically significant negative linear relationship with offline cognitive dissonance (r= -0.168., at p < .042). In general, this highlights that the higher the price consciousness, lower the cognitive dissonance in both online and off line purchase.

6. Findings :

The study was conducted to identify the relationship between price consciousness and cognitive dissonance while making both online and offline purchases. The analysis presented the following findings.

Price consciousness is found to be high for Gen Z while they make both online and offline apparel purchases. Price is one factor that predominantly influences the Gen Z customers' purchase decisions, reaffirming that they are 'price conscious'. While analyzing the relationship between price consciousness and cognitive dissonance, it could be inferred that there is a significant relationship between these two variables among the respondents selected for the study.

7. Conclusion

Post pandemic, the economy is witnessing resilience in a very few industries and retail is one among them. The study is done to assess the post purchase anxiety prevailing among the youth belonging to the Generation Z, while they purchase apparels online. The survey report by McKinsey (2019) has brought to lightthe fact that Gen Z is cautious while spending money on purchases and this inference goes well with the findings of the study. Hence, companies should remain competitive in both quality and price, which is a prerequisite to win the allegiance of Gen Zers. Gen Zers who are truly digital natives are well informed than the previous generations and hence they also try to find a value for the money they spend. Hence the retailers should devise suitable strategies to cater to this pragmatic generation who access and evaluate a broad range of information before purchases. As these digital natives rely more on internet for accessing information, it is imperative that the marketers also should provide positive strokes by showcasing excellent reviews about the products. This will enable the retailers to further reduce the cognitive dissonance as well as to reinstate their business and appealing to the younger generation.

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PERSONALITY AND ACHIEVEMENT MOTIVATION AMONG UNDERGRADUATE STUDENTS IN COCHIN

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PERSONALITY AND ACHIEVEMENT MOTIVATION AMONG UNDERGRADUATE STUDENTS IN COCHIN

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Abstract:
‘Personality and Achievement Motivation are the two factors which play an important role in the life of Students in colleges. A study was conducted to find the personality and achievement motivation of college students in Cochin. Two standardised questionnaires Deo-Mohan Achievement Motivation Scale and Five Factor Personality Inventory developed by Dr. Kumari Bhagavathy and Dr.Neelima Renjith were used . A sample containing 200 undergraduate students comprising of 100 girls and 100 boys were used for the study. This sample includes 82Arts and 118 Science stream undergraduate students. It was deduced that there was no correlation between personality traits and achievement motivation of the undergraduate students. Significant difference in achievement motivation between boys and girls was also noticed in the sample of undergraduate students in Cochin. No difference in personality traits with respect to gender was seen in agreeableness and neuroticism but difference was noticed in extraversion, conscientiousness, or openness to experience. Difference was noticed in achievement motivation of undergraduate Arts and Science stream students in Cochin.
Key words: Personality Traits, Achievement Motivation

Education is the holistic development of an individual’s intellect, skills and abilities so as to equip them to be successful in all spheres of life. It not only creates intelligent professionals but also plays a huge part in the enhancement of one’s emotional and social quotient sculpting social beings who can tide through any adverse situations. Education is a lifelong process, begins at birth and continues throughout one’s life. As Mahatma Gandhi rightly said, education is the all-round development of one’s personality. The kind of education one receives determines one’s personality and behaviour. Education often helps one achieve success in their life. However, to attain success one should be achievement oriented and motivated.

Personality represents a unique integration of behavioural and mental characteristics evolved from biological and environment factors that differentiates one person from another on the basis of quality. Today, many psychologists believe that all personality traits derive from five basic personality traits, which are commonly referred to as the Big Five .They are Extraversion: Sociable and stimulation-oriented Vs. Quiet and stimulation-avoiding, Neuroticism: Emotionally volatile, prone to negative emotions Vs. Calm, composed, optimistic, Agreeableness: Friendly, conciliatory Vs. Aggressive, dominant, disagreeable Conscientiousness: devoted, painful, and orderly Vs. Laidback, spontaneous, and unreliable ,Openness to Experience: Open to novel ideas and change Vs. Traditional and oriented towards routine.

Achievement refers to a state of relative success and motivation refers to a drive or instigation to get or do something. Thus, achievement motivation may be defined as energisation and direction of behaviour in pursuit of success. It is an important determinant of aspiration, effort, and persistence. This achievement motivation maybe acquired both externally and internally. Though all people have some sort of achievement motivation in them, it varies from person to person. Some keep extremely high standards for themselves and toil hard in order to succeed while some keep an exceptionally low bar for themselves and take little or no effort to accomplish a deed. Childcare practices, socio- cultural and economic conditions of family, parental expectations about their children, the conditions in which particular groups live and culture of the society influence in developing a person's motive to achieve. People who are achievement oriented tend to enjoy life better and have better self- respect.

Review of Related Literature

Various studies have shown that the factors of personality influence the academic achievement. Hendersen, V. L. & Dwekk, C. S. (1996) also showed that educational achievement is also influenced by motivation in a series of studies, strongest relationship between self-beliefs, academic background and achievement (House, D. J. 1997). Jain, M. (1987) has proved that academic achievement is positively correlated with motivation and personality factors (Neuroticism & Extroversion).

Scope of the Study

The present research aims to study the Personality and Achievement Motivation among Undergraduate College Students in Cochin. Many studies have been done on personality, level of aspiration or achievement motivation of college students. In the present study the researcher aims to study personality and achievement motivation of undergraduate college students in Cochin (Kerala – India). This study aims to improve the standard of achievement of students and thus reducing their academic wastage. It is especially important to give an awareness to the students about personality traits and achievement motivation and accordingly they can attain the goal of education system.

Also, this study will help to improve their physical, emotional, and psychological maturity. This study also helps academic counsellors to give suitable guidance and counselling to the needed students.

Objectives

- To study the relationship between personality traits and achievement motivation among undergraduate students in Cochin.
- To study the significant gender difference in achievement motivation among undergraduate students in Cochin.
- To study the gender difference in personality traits among undergraduate students in Cochin.
- To study the difference in achievement motivation of arts and science undergraduate studentsin Cochin.

Hypotheses of the Study

H_0 (1) There will be no significant relationship between extraversion and achievement motivation of undergraduate college students in Cochin.

H_0 (2) There will be no significant relationship between agreeableness and achievement motivation of undergraduate college students in Cochin.

H_0 (3) There will be no significant relationship between conscientiousness and Achievement motivation of undergraduate college students in Cochin.

H_0 (4) There will be no significant relationship between neuroticism and achievement motivation of undergraduate college students in Cochin.

H_0 (5) There will be no significant relationship between openness to experience and achievement motivation of undergraduate college students in Cochin.

H_0 (6) There will be no significant gender difference in achievement motivation of undergraduate college students in Cochin.

H_0 (7) There will be no significant difference in extraversion of undergraduate male and female college students in cochin.

H_0 (8) There will be no significant difference in agreeableness of undergraduate male and female students in Cochin.

H_0 (9) There will be no significant difference in conscientiousness of undergraduate male and female students in Cochin.

H_0 (10) There will be no significant difference in neuroticism of undergraduate male and female students in Cochin.

H_0 (11) There will be no significant difference in openness to experience of undergraduate male and

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female students in Cochin.

H_0 (12) There will be no significant difference in achievement motivation of arts and science undergraduate students in Cochin.

Results of the Findings

The present study attempted to assess the personality traits and Achievement Motivation of undergraduate college students in Cochin. For these total 200 Students were taken as a sample. The *t-test* was applied for the purpose of statistical interpretation to test the significance of difference between means. While to check co-relation, Karl-person 'r' method was used. Result and discussion are as follows:

Table 1: Correlation matrix of Five personality traits and Achievement Motivation of undergraduate college students in Cochin.

Variable	Extraversion	Agreeableness	Conscientiousness	Neuroticism	Opennessto experience
Correlation coefficient	.026	-.003	.214**	-.077	.048
Sig.	.712	.965	.002	.278	.499
N	200	200	200	200	200

Table 1 shows the correlation coefficient computed using Pearson Correlation to assess the five personality traits such as extraversion, Agreeableness, Conscientiousness, Neuroticism, Openness to experience and Achievement Motivation of undergraduate college students in Cochin.

From the above table the following conclusions may be derived:

The correlation coefficient of personality trait extraversion - and achievement motivation was found to be. 026 (P<0.05). The result indicates that the extraversion and achievement motivation of undergraduate college students in Cochin were correlated.

Hence the H0 (1) there will be no significant relationship between extraversion and Achievement motivation among undergraduate students in Cochin is rejected.

The correlation coefficient of Agreeableness -a personality trait and achievement motivation was found to be -.003 (P<0.05) The result indicates that the Agreeableness and achievement motivation of undergraduate college students in Cochin were correlated.

Hence the H0 (2) that there will be no significant relationship between Agreeableness and Achievement motivation among undergraduate students in Cochin is rejected.

The correlation coefficient of conscientiousness and achievement motivation was found to be. 214 (P>0.01). The result indicates that the conscientiousness -and achievement motivation of undergraduate college students in Cochin were not correlated.

Hence the H0 (3) that there will be no significant relationship between conscientiousness and Achievement motivation among undergraduate college students in Cochin is accepted.

The correlation coefficient of neuroticism and achievement motivation were found to be-
.077(P>0.05) The result indicates that the neuroticism and achievement motivation of undergraduate college students in Cochin were not correlated.

Hence the H0 (4) that there will be no significant relationship between neuroticism and Achievement motivation among undergraduate students in Cochin is accepted.

The correlation coefficient of openness to experience -a personality trait and achievement motivation was found to be. 048 (P<0.05).The result indicates that the openness to agreeableness and achievement motivation of undergraduate college students in Cochin were correlated.

Hence the H_0(5)that there will be no significant relationship between openness to experience and Achievement motivation among undergraduate student in Cochin is rejected.

Table 2: Achievement motivation of male and female undergraduate students in Cochin.

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Variable	Group	N	Mean	Std. Deviation	t- value	P value
achievement motivation	Male	100	133.27	21.15		
	Female	100	131.47	21.82	.592	**.554**

The above table shows the mean, standard deviation, t- value and P value of Achievement motivation difference among male and female undergraduate college students in Cochin. Mean value for the variable achievement motivation of undergraduate male and female students were found to be 133.27 (S.D = 21.15) and 131.47(21.82) respectively. The t-value was found to be .592 and P value was found to be .554 (P>0.05). The result indicates that there is significant difference in achievement motivation between male and female undergraduate students in Cochin.

Hence the hypothesis $H_0 6$, there will be no significant gender difference in achievement motivation of undergraduate college students in Cochin, is rejected.

Table 3: Extraversion as a factor of personality trait among the male and female undergraduate students in Cochin.

Variable	Group	N	Mean	Std. Deviation	t- value	P value
Extroversion	Male	100	55.39	8.23		
	Female	100	53.75	9.39	1.31	.191

The above table shows the mean, standard deviation, t- value and P value on extraversion as a factor of personality trait among the male and female undergraduate students in Cochin. Mean value for the variable extraversion of undergraduate male and female students were found to be 55.39(S.D = 8.23) and 53.75 (S.D = 9.39)respectively . The t value was found to be 1.31 and P value was found to be .191 (P>0.05). The result indicates that there is significant difference on extraversion between male and female undergraduate students in Cochin.

Hence the hypothesis $H_0 7$,there will be no significant difference on extraversion of male and female undergraduate college students in Cochin, is rejected.

Table 4: Agreeableness as a factor of personality trait among the male and female undergraduate students in Cochin.

Variable	Group	N	Mean	Std. Deviation	t- value	P value
Agreeableness	Male	100	66.06	6.4		
	Female	100	68.81	7.3	2.81	.005

The above table 4 shows the mean, standard deviation, t- value and P value on agreeableness among the undergraduate students in Cochin. Mean value for the variable agreeableness of undergraduate male and female students were found to be 66.06 (S.D = 6.4)and 68.81 (S.D =7.3) respectively .The t value was found to be 2.81 and P value was found to be .005 (P<0.01). The result indicates that there is no significant difference in agreeableness as a factor personality trait between male and female undergraduate students in Cochin. Female Undergraduates show more agreeableness than male undergraduates.

Hence the hypothesis$H_0 8$, there will be no significant difference in agreeableness of undergraduate male and female college students in Cochin ,is accepted.

Table 5: Conscientiousness between male and female undergraduate students in Cochin.

Variable	Group	N	Mean	Std. Deviation	t- value	P value
Conscientious ness	Male	100	50.67	8.15		
	Female	100	49.72	7.10	.878	.381

The above table shows the mean, standard deviation, t- value and P value on conscientiousness as a trait of personality among the undergraduate students in Cochin. Mean value for the variable conscientiousness of undergraduate male and female students were found to be 50.67 (S.D = 8.15) and 49.72 (S.D = 7.10) respectively. The t value was found to be .878 and P value was found to be .381 (P>0.05). The result indicates that there is significant difference in conscientiousness between male

and female undergraduate students in Cochin.
Hence the hypothesis $H_0$9 there will be no significant difference in conscientiousness of undergraduate male and female college students in Cochin, is rejected.
Table 6 :Neuroticism as a factor of personality trait among the male and female undergraduate students in Cochin.

Variable	Group	N	Mean	Std. Deviation	t- value	P value
Neuroticism	Male	100	36.42	8.78	2.42	.016
Female		100	39.52	9.28		

The above table shows the mean, standard deviation, t- value and P value on neuroticism as a trait of personality among the undergraduate students in Cochin. Mean value for the variable neuroticism of undergraduate male and female students were found to be 36.42 (S.D = 8.78) and39.52 (9.28) respectively. The t value was found to be 2.42and P value was found to be.016 ($P<0.05$). The result indicates that there is no significant difference in neuroticism as a factor of personality trait between male and female undergraduate students in Cochin.
Hence the hypothesis $H_0$10, there will be no significant difference in neuroticism of undergraduate male and female students in Cochin, is accepted.
Table 7 : t test based on Openness to experience among the male and female undergraduate students in Cochin.

Variable	Group	N	Mean	Std. Deviation	t- value	P value
Openness to experience	Male	100	48.2	5.8		
	Female	100	49.5	5.7	1.58	.115

The above table shows the mean, standard deviation, t- value and P value of openness to experiences among the undergraduate students in Cochin. Mean value for the variable openness to experience of undergraduate male and female students were found to be 48.2 (SD = 5.8) and 49.5 (5.7) respectively. The t value was found to be 1.58 and P value was found to be .115. The result indicates that there is significant difference in openness to experiences between male and female undergraduate students in Cochin.
Hence the hypothesis H_0(11), there will be no significant difference in openness to experience among undergraduate male and female students in Cochin, is rejected.
Table 8: Achievement motivation of Arts and Science undergraduate students in Cochin.

Variable	Group	N	Mean	Std. Deviation	t- value	P value
Achievement Motivation	Arts	82	131.82	21.41	.296	.767
Science		118	132.74	21.57		

able 8 shows the mean, standard deviation, t- value and P value on achievement motivation among the undergraduate students in relation to Arts and Science undergraduate students in Cochin. Mean value of achievement motivation for the variable of arts and science undergraduate students in Cochin were found to be 131.82 (SD = 21.41) and132.74 (21.57) respectively. The t value was found to be .296 and P value was found to be .767 ($P>0.05$). The result indicates that there is significant difference in achievement motivation Arts and Science undergraduate students in Cochin.
Hence the hypothesis $H_0$12, there will be no significant difference in achievement motivation of Arts and Science undergraduate students in Cochin, is rejected.

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Discussion of the Findings

As per the study conducted among undergraduate students to assess the correlation between personality traits and achievement motivation, it has been found that there is significant correlation with respect to personality traits namely extraversion, agreeableness, and openness to experience and achievement motivation. Whereas it has also been noticed that there is no significant correlation between personality traits namely conscientiousness and neuroticism and achievement motivation.

It has also been observed that there is significant difference in achievement motivation between male and female undergraduate students in Cochin. The result from the present study corroborates with the findings of Adsul et al. (2008) who investigated the effects of gender, economic background and caste differences on achievement motivation possessed by college students based on societal transformation. As per other findings male students were observed to be having a high achievement motivation while female students having a below average level of achievement motivation. In contrast ,the findings of Nagarathanamma & Rao (2007) did not find any significant difference in achievement motivation between boys and girls.

It has also been noticed that there were both similarities and differences among male and female students in personality traits. Both male and female students did not seem to differ on two out of the five personality traits. There is no significant difference with respect to gender in agreeableness and neuroticism. Whereas Significant difference was observed with respect to gender in extraversion, conscientiousness, and openness to experience. Most studies have indicated to the negative correlation between neuroticism and academic achievement (Laidra et al. 2007). Some studies have recommended a relationship between openness to experience and academic achievement (Paunonen& Ashton, 2001). Duff et al. (2004) reported that agreeable people are highly cooperative, supportive, and willing to work effectively with others, positive relationships between agreeableness and academic achievement is not far from expectation. Furnham et al. (2006); Duckworth & Seligman (2005); and Lounsbury et al. (2003) concluded more agreeable students tended to have higher GPAs and consequently higher academic achievement.

It has also been noticed that there was significant difference in achievement motivation of Arts and Science undergraduate students in Cochin. In support to the present study, Upadhyay and Tiwari (2009) evaluated the effect of academic majors on achievement motivation of the students and concluded that students of science stream had significantly higher achievement motivation in comparison to Social Science, Humanities and Commerce stream.

Conclusion of the Findings

Present research is useful to know the effect of Personality traits and Achievement Motivation of undergraduate students in Cochin. The findings of the study revealed that there is significant relation between three personality traits(extraversion, agreeableness, and openness to experience) and achievement motivation and no relation between two personality traits(conscientiousness and neuroticism) and achievement motivation among undergraduate students in Cochin. Significant difference was found in achievement motivation of male and female undergraduate college students in Cochin. When the five personality traits of male and female students were studied it has also been found that there is no significant difference with respect to gender in agreeableness and neuroticism and Significant difference was observed with respect to gender in extraversion, conscientiousness, and openness to experience. There is significant difference in achievement motivation of Arts and Science undergraduate students in Cochin. The findings of the study will help the academic counsellors to understand the students properly and thereby assist them to improve their achievement motivation as well as their personality traits .

Our study deduced that female students lacked in achievement-oriented motivation when compared to male students. However, when this is weighed against the pass percentage of college level students in Cochin, we find a paradox as female students perform much better than male students. This shows that female students are equal to or better than their male counterparts in terms of their ability to perform academically but often do not persevere long term due to lack of motivation.

Therefore, greater motivation has to be given to female students to pursue higher studies and strive for

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success in life.

Through the years, we as a society have given more prominence to science than arts stream. This has affected the mentality of the students too as arts students believe that they do not have as many opportunities to succeed like what the other stream has and often slack. However, trends show an increasing number of opportunities for arts students. So, it is important to provide ample external motivation to students especially those in the arts stream As per the result of the study it can be inferred that parents, teachers and elders have a good role in instilling a positive effect on the students which would eventually lead to success. The learners should be encouraged so that they can have higher degree of motivation to achieve greater things in their life. Proper environment in and outside the class should be provided to the students for developing an achievement directed behaviour. The college authorities are expected to provide ample opportunities to the students for the development of their potential which will accelerate theirachievement.

This is a sincere attempt to measure the Personality and Achievement Motivation of undergraduate students who are considered as the pillars of our society. This research has its own achievements and faults. It has its own strong and weak points. Keeping them all in mind, if interpreted accordingly this study will be of great importance to our society.

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OVERVIEW ON DEEP LEARNING WITH IOT

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OVERVIEW ON DEEP LEARNING WITH IOT

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Abstract- The recent technological inventions and brisk admixture of disciplines similar as seeing and actuating technologies, embedded systems, wireless communication, and data analytics are accelerating the growth of the Internet of effects (IoT). The massive number of detectors stationed in IoT induce humongous volumes of data for a broad range of operations similar as smart homes, smart healthcare, smart manufacturing, smart transportation, smart grid, smart husbandry, etc. assaying similar data in order to grease enhanced decision timber, increase productivity and delicacy, meliorate profit is a critical process that makes IoT a precious idea for businesses and a standard of life perfecting paradigm. Although inferring concealed information and consequences out of IoT data is promising to ameliorate the standard of our lives, it's a complicated task that cannot be fulfilled by conventional paradigms. Deep learning would play a vital part in creating smarter IoT as it has shown remarkable results in different fields including image recognition, information reclamation, speech recognition, natural language processing, inner localization, physiological and cerebral state discovery, etc., and these form the foundation services for IoT operations.
Keywords: Deep learning, IoT, Artificial intelligence, Deep Neural Network, ANN, SVM, IIoT

1. INTRODUCTION

The thing of the Internet of effects(IoT) is to convert day-to-day objects to being smart by exercising a broad range of sophisticated technologies, from embedded bias and communication technologies to data analytics. The changeable growth in the number of biases connected to IoT and the exponential rise in data consumption manifest how the expansion of big data seamlessly coincides with that of IoT. The confluence of big data and the IoT is hastily raising and touching different fields of technologies and businesses. IoT is being used as a field for garnering huge business earnings. It's extremely important to squeeze out swish opinions or wisdom from the data that's being fed into the systems of business associations. Data analytics means assaying every member of data in order to identify trends in the data, extract concealed information and to dig out precious information from the raw data generated by IoT systems. The main end of data analytics in IoT systems is to attain better interpretation of data, and thus, formulate effective and complete control opinions to grease different user-specific and business-oriented operations. Enormous openings arise by the eventuality of assaying massive quantities of data produced by IoT bias, including operations like smart homes, smart healthcare, smart manufacturing, etc. The high element of the IoT operations is an effective data logical system that can perform tasks like classification, clustering, regression, etc. Deep learning is being considerably used for data analytics in IoT operations. Deep learning and IoT have been demonstrated to be among the three leading strategic technological trends for the time 2017. The reason behind this rigorous hype of deep learning is the incapacity of conventional machine learning ways to meet the rising logical demands of IoT systems. Fortunately, the advancements in machine learning paradigms are violating the doors for asked data analytics in IoT operations. Deep learning models have shown remarkable results in different fields including image recognition, information recovery, speech recognition, natural language processing, inner localization, physiological and cerebral state discovery, etc., and these form the foundation services for IoT operations.

2. DEEP LEARNING

Deep learning is a prosecution of Artificial Intelligence (AI). The main end of artificial intelligence is how mortals act and think (in all aspects) as a system can do. It gratuities up the capability of computers to do work automatically by taking times of the history of experience. Deep learning (DL) emphasized one development of programs that can recoup data and use its learning.
Deep learning uses numerous- layered neural networks to learn the position of abstraction and representation that provides a sense of data. It uses numerous supervised and unsupervised learning styles and representations to make state-of-the-art. Ultra-modern Artificial Intelligence (AI) is shaped by using the styles of advanced Deep learning approaches.

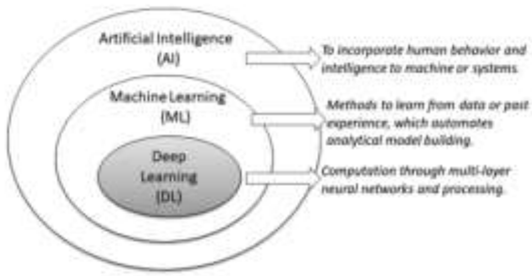

Figure 1: An illustration of the position of deep learning (DL), compared with machine learning (ML) and artificial intelligence (AI)

2.1.HISTORY OF DEEP LEARNING ARCHITECTURE.

Artificial Neural Networks (ANN) or Neural networks (NN) are a collection of connected units or bumps called artificial Neurons. These neurons transmit the signals. In ANN, three factors are there called Neurons (input), Connections and Weights (neuron to neuron), and Prorogation function (sum of weights of neurons). Exemplifications train neural networks. Each illustration contains input and affair. To get asked affair we use a Model, which is a Data Structure conforming to algorithms and a Directed Weighted Graph. The following figure represents an introductory Neural Network.
The conventional ANN is made up of simple neural layers and is used for simple computations. Next Back Propagation came into ANN after that Support Vector Machine(SVM) and it's better than ANN. latterly we got a new network called Boltzmann Machine that makes learning easier. Machine knowledge models are rested on artificial neural networks. These are suitable for supervised knowledge.
Deep knowledge is ultramodern technology rested on neural networks that try to work as a mortal cortex. Deep knowledge armature consists of neural networks and is rested on several layers that exercise data into outgrowth results. There are substantially three layers called the input layer, retired layers, and affair layers.
Input layer raw data. Retired layers where algorithms exercise the inputs. Affair sub caste colorful conclusions and results.

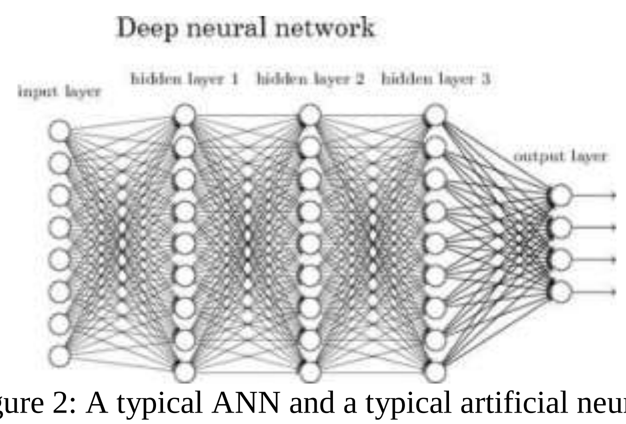

Figure 2: A typical ANN and a typical artificial neuron.

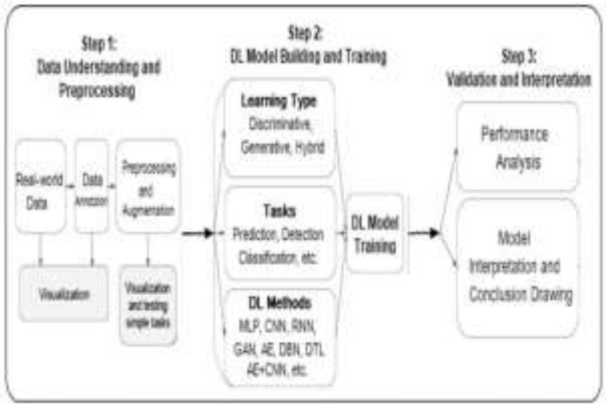

Figure 3: A typical DL workflow to solve real-world problems, which consists of three sequential stages (i) data understanding and preprocessing (ii) DL model building and training (iii) validation and interpretation

2.2.CURRENT TRENDS IN DEEP LEARNING

The main focus of the moment's Fourth Industrial Revolution (Industry4.0) is generally technology-driven robotization, smart and intelligent systems, in colorful operation areas including smart healthcare, business intelligence, smart metropolises, cyber security intelligence, and numerous further. Deep literacy approaches have grown dramatically in terms of performance in a wide range of operations considering security technologies, particularly, as an excellent result for uncovering complex armature in high-dimensional data. Therefore, DL ways can play a crucial part in erecting intelligent data-driven systems according to the moment's requirements, because of their excellent literacy capabilities from literal data. Accordingly, DL can change the world as well as humans' everyday life through its robotization power and learning from experience. DL technology is thus applicable to artificial intelligence machine learning and data wisdom with advanced analytics which are well-known areas in computer wisdom, particularly, moment's intelligent computing.

3. IOT

The Internet of Things (IoT) describes the network of physical gadgets —"things"—which can be embedded with sensors, software, and different technology for the reason of connecting and changing information with different gadgets and structures over the internet. These gadgets vary from regular family gadgets to state-of-the-art business tools. With greater than 7 billion linked IoT gadgets today, specialists are waiting for this variety to develop to 22 billion through 2025

Over the beyond few years, IoT has ended up one of the maximum critical technology of the twenty-first century. Now that we are able to join normal objects—kitchen appliances, cars, thermostats, child monitors—to the net through embedded devices, seamless verbal exchange is feasible among people, processes, and matters. By manner of low-fee computing, the cloud, large facts, analytics, and cellular technology, bodily matters can percentage and acquire facts with minimum human intervention. In this hyper-connected international, virtual structures can record, monitor, and modify every interplay among linked matters. The bodily international meets the virtual international—and they cooperate.

3.1.TECHNOLOGIES OF IOT

While the concept of IoT has been in life for a protracted time, a group of latest advances in some of the one-of-a-kind technology has made it practical.

• Access to low-cost, low-strength sensor era. Affordable and dependable sensors are making the IoT era viable for extra manufacturers.
• Connectivity. A host of community protocols for the net has made it smooth to attach sensors to the cloud and to other "things" for green facts transfer.
• Cloud computing structures. The growth inside the availability of cloud structures allows each agency and customer to get the right of entry to the infrastructure they want to scale up without absolutely having to control it all.
• Machine getting to know and analytics. With advances in device getting to know and analytics, alongside getting right of entry to numerous and tremendous quantities of facts saved inside the cloud, agencies can acquire insights quicker and extra easily.
The emergence of those allied technologies maintains to push the bounds of IoT and the facts produced via way of means of IoT additionally feed those technologies.
• Conversational synthetic intelligence (AI). Advances in neural networks have delivered natural-language processing (NLP) to IoT devices (including virtual non-public assistants Alexa, Cortana, and Siri) and made them appealing, affordable, and feasible for domestic use.

3.2.INDUSTRIAL IOT

Industrial IoT (IIoT) refers back to the utility of IoT generation in business settings, mainly with admire to instrumentation and manage of sensors and gadgets that interact with cloud technologies. Refer to this Titan use case PDF for an awesome instance of IIoT. Recently, industries have used system-to-system communication (M2M) to obtain wi-fi automation and manage. But with the emergence of cloud and allied technologies (along with analytics and system learning), industries can obtain a brand new automation layer and with it create new sales and commercial enterprise models. IIoT is occasionally referred to as the fourth wave of the economic revolution, or Industry 4.0. The following are a few not unusual place makes use of for IIoT: • Smart manufacturing • Connected belongings and preventive and predictive maintenance • Smart energy grids • Smart cities • Connected logistics • Smart virtual delivery chains

3.3.IOT APPLICATIONS

Business-ready, SaaS IoT Applications IoT Intelligent Applications are prebuilt software-as-a-service (SaaS) packages that can examine and gift captured IoT sensor information to enterprise customers through dashboards. We have a complete set of IoT Intelligent Applications. IoT packages use gadgets gaining knowledge of algorithms to investigate huge quantities of linked sensor information inside the cloud. Using real-time IoT dashboards and signals, you advantage visibility into key overall performance indicators, facts for implying time among failures, and different information. Machine gaining knowledge of–primarily based totally algorithms can discover device anomalies and ship signals to customers or even cause automatic fixes or proactive countermeasures. With cloud-primarily based totally IoT packages, enterprise customers can quickly decorate current approaches for deliver chains, patron service, human resources, and monetary services. There's no want to recreate complete enterprise approaches.

4. UNDERSTANDING THE ROLE OF DL IN IOT

Deep Learning will play a massive part in how we use and cover IoT bias. It's important as the relationship between the mortal brain and body. The body uses sensitive input similar to sight, touch, and sound to gain situational mindfulness of its surroundings, and the brain uses the data to make informed intelligent decisions. Of course, the real challenge is to find a way to seamlessly connect a range of different biases on a single, unified platform without immolating information and data. Imagine being suitable to control all your IoT bias on a single platform at the touch of your fingertips. The operation of deep literacy in IoT is fleetly arising and developing.

Fig 4 : Application of DL in IoT

5. CONCLUSION

Deriving insights from raw IoT data is a large complex task that goes beyond the capability of traditional data logical paradigms. This paper provides a comprehensive overview of a sophisticated machine learning fashion called Deep learning that has been set up to be relatively effective for assaying largely complex data generated by IoT operations. Deep learning models are better than conventional machine learning paradigms in the following ways. First, they palliate the demand for supervised point sets to be employed for training. Accordingly, features that might not be recognizable to a human can be uprooted easily by Deep Learning models. Also, Deep Learning models induce more accurate results. Likewise, Deep learning models are applicable for modeling intricate actions of miscellaneous datasets. This paper provides a detailed discussion of Deep Learning architecture.

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INFLUENCE OF SOGO OR MUSIC LOGO IN BRAND IDENTIFICATION

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Abstract:

Nothing can penetrate to consumer's mind like a soothing music. Even the consumers noticed the music contents in ads and they knew this music can be a strong marketing tool, they are not much aware about the term 'sonic branding' or 'music branding. Consumers are becoming a part of this branding without knowing the exact concept of sonic branding. Awareness of consumers changes with their age as well as gender. Sogo of ads are memorable and consumers are able to identify the brand using the logo. Unique sogo will attract consumers more to the brand. Sogo attached ads are capturing the minds of consumers more than non-sound ads. Conclusion is also consistent to the finding of Bagdare and Bansal (2014).

Keywords*: Sogo, Sonic Logo, Music Logo, Sonic Branding Sound Barnding, Music Branding Barng Identification*

Introduction

Brands are a part of every individual, which possess the capacity of being a bench mark of standard of living. Manufactures always put diversified efforts to place their brand in the minds of the customers. The way of making brands more familiar is unique to every seller. They use audio as well as video aids to make their brands superior.

The use of audio aids is becoming widely accepted method of brand identifying recently. Attractive and catchy background music, song, sound effects etc. are part of audio-based branding. This method of branding also known as sound branding or sonic branding. These techniques are following by many of Indian and foreign brands. Some of the popular brands with sonic branding are quoted here. Airtel network service provider is known for its music which is composed by famous music director A R Rahman from its initial stage, Nokia Mobile manufacturer is also giving a catchy piece of music for its standard caller tune,

Sonic logo is an important element in brand identification. It helps the business firms to get more popularity like a normal brand logo. It can be a piece of music, or any sound gesture to attract the minds of the customers towards the product. It is really working among customers. Many people put catchy and attractive sogos as their mobile ringtones. Sogos have the power of making an impact in customer behaviour.

Review of Literature:

Sonic branding makes the value of the brand to the better position. Use of sonic elements in advertisements help the business to focus on customer attention. It's the perfect tool to create brand image in the minds of the customers. The audible aspect can be used in a more effective manner (Sebastian Bollue, 2015). A study by Alexander and Heyd (2014) found that sonic branding has a clear influence on fashion retailers. The power of sound branding makes the relationship between retailer and consumers healthier. The research made an analysis on the impact of sound among retailers. It should not be restricted but be integrated across a retailer's multiple brand touch points. It is very clear that significant variance is there if the sound element is used in the promotion of the products. Studies about sport marketing has proved that there is a formative role of music in affecting sport consumer behaviour. But there is a lack of expertise on the effective use of music elements in marketing. There are different approaches exist to influence a greater number of consumers behaviours with music (Balloui, 2014).

Sonic branding is the expression of the brand identity which has equal importance of brand logos (Susie Khamis, 2021). It's a better tool to communicate to the society and to create better awareness of brands. Initially visual aids were the key factor but today it has moved to Audio aids. Many research works have been there regarding the general concepts of the sound branding but only few on the methods of sound branding. This is the case study of MasterCard and HSBC which holds a significant role of music in branding (Susie Khamis, 2021; Lluis Mas Manchon, 2019). Sonic branding is the strategic use of sound to communicate the identity and values of the brands. Calmness or excitement and pleasantness are associated with different sonic logo features. Research revealed that slow and fade up sogos are slightly more pleasant and simpler that fast and fade up sogos. Combination of fade up and ascending pitch is less exciting and less aggressive than the combination of fade down and descending pitch. Deeper understanding of the processing of sound is necessary to make an impact among customers. (Lluis Mas Manchon, 2019).

There is a connection between the use of audio-visual elements on branding and the brand interest, emotional brand attachment and consumer engagement. Sound branding strategies have higher impact on the establishment of consumer attachment towards brand. Consistent audio branding without visual elements has higher impact on the emotions of the customers (Svea Laura Benad, 2016). Effect of sogos in branding and willingness of the consumers to buy are examined in a research by Krishnan, Kellaris and Aurand (2012) research. It's a key element in branding. Number of tones in a sogo systematically influences the behavior of the consumers. Sogos with very few tones have less impact on customers.

Statement of Problem:

People will always have preference on branded products. It's a symbol of individual's standard of living. This idea is very much exploited by the business firms. They use different techniques to create brand awareness and to identify their brands. Use of audio elements is the most advanced tool of brand identification. It is called sonic branding.

Objectives

The study intends;

- To analyse the awareness about sonic branding
- To assess association of awareness with socio economic variables
- To study the influence of sogo / music logo among consumers

Methodology

The study empirical in nature using data collected through questionnaires distributed among consumers who are selected randomly. A sample of seventy-five consumers Lulu Hypermarket were selected for the study. One sample t test is used to test the consumer awareness on sonic branding and influence of sogo/ music logo among consumers. ANOVA and independent sample t test used to analyse the association of consumer awareness on sonic branding with socio-economic variables.

Limitations:

- Study is limited to seventy-five consumers.
- Reluctance of the people in disclosing their personal interest and preferences
- Non- cooperative mentality of the respondents

Results:

Table 1: Profile of Sample

Variable	Category	Frequency	Percentage
Gender	Male	42	56
	Female	33	44
	Transgender	0	0
	Total	**75**	**100**
Age	Below 20	12	16
	20-30	19	25.33
	30-40	19	25.33
	40-50	16	21.33
	Above 50	9	12
	Total	**75**	**100**
Education	SSLC	4	5.33
	Plus Two	11	14.67
	Degree	27	36.00
	PG	19	25.33
	Professional	14	18.67
	Total	**75**	**100**
Occupation	Government	11	14.67
	Private	36	48.00
	Agriculture	4	5.33
	Self employed	10	13.33
	House wife	14	18.67
	Total	**75**	**100**
Region	Urban	25	33.33
	Semi urban	24	32.00
	Rural	26	34.67
	Total	**75**	**100**

Source: Survey data

Table 2: Consumer awareness on sonic branding

Variable	Mean Score
Ever noticed ads that have music contents	3.78
Do you think a unique music logo/sogo can be a marketing tool	3.52
Have you ever heard the term sonic branding or music branding	1.8

Source: Survey data

Table 1 shows the profile of sample of the study.Consumer awareness on sonic branding is measured using three statements (Table 2). Consumers have noticed ads with music contents. They think that unique music logo/sogo can be a marketing tool. But they are not that much aware about the term ‘sonic branding or music branding’

Table 3: Association of consumer awareness on sonic branding with socio-economic variables

Variable	P Value	Inference
Gender	0.038	Significant*
Age	0.015	Significant*
Education	0.065	Not Significant
Occupation	0.069	Not Significant
Region	0.089	Not Significant

*Significant at 5% level of significance Source: Survey Data

Table 3 consists of association of consumer awareness on sonic branding with socio-economic variables. T test and ANOVA tests used to measure the association. Gender and age found significantly associated with the awareness of consumer on sonic branding, whereas other variables viz. education, occupation and region where not significantly associated with awareness on sonic branding.

Table 4: Influence of sogo/ music logo among consumers

Variable		Mean Score	P value	Inference
1	Sogo/ music logo of ads are memorable	3.22	<0.05	Significant*
2	The sogo/music logo helps to identify the brand	4.65	<0.05	Significant*
3	Music contents in ads are enjoyable	3.10	<0.05	Significant*
4	Sogo attached ads are capturing the minds of consumers more than non-sound ads	3.39	<0.05	Significant*
5	A unique sogo will attract consumers more to the brand	3.01	<0.05	Significant*
6	Hearing the ads repeatedly can make the consumers irritated	3.03	<0.05	Significant*

*Significant at 5% level of significance Source: Survey Data

Influence of sogo/music logo among consumers were analysed using six statements (Table 4). All the six statements showed a mean score above 3 denoting a positive opinion with 5% level of significance. One sample t test is used for testing the significance of statements.

Conclusion

Even the consumers noticed the music contents in ads and they knew this music can be a strong marketing tool, they are not much aware about the term ‘sonic branding’ or ‘music branding. Nothing penetrates a human mind like a soothing music. Consumers are becoming a part of this branding without knowing the exact concept of sonic branding. Awareness of consumers changes with their age as well as gender. Awareness of different age group significantly differs along their age. Consumers stated that sogo of ads are memorable and they are able to identify the brand using the logo. Unique sogo will attract consumers more to the brand. They also made a positive response to the music content in ads. Sogo attached ads are capturing the minds of consumers more than non-sound ads. Conclusion is also consistent to the finding of Bagdare and Bansal (2014). Repeatedly playing of these ads can make them irritated too.

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Enhancement of Social Training and Social Interaction among the Tribes

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Enhancement of Social Training and Social Interaction among the Tribes

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Abstract–Social training and social interactions give better behavioural manners and set a clear vision towards the world. Acquiring new knowledge and adapting with new social environment train them how to mingle in-group or society. Social interactions develop the smooth relations in society and it leads into the characteristic of the Socio-Entrepreneurship. Social organisations have a great role in the social trainings and social interactions. The role of social trainings and social interactions among the tribes are very praiseworthy and the matter of discussion subject. The poverty alleviation missions, Non-Governmental Organisations (NGOs), various levels of village level training centres teach the poor people, especially illiterates, through social training and social interaction methods. The core output of these trainings is social enabling and it turns into livelihood income. The Vana Samrakshana Samithi (VSS) is the part of the Participatory Forest Management (PFM), it is functioning among the village level body and the forest department is facilitating VSS activities and supervision. Social trainings, social interactions and supporting of the livelihood income are included in the VSS activities. This paper attempts to study the role and output of social trainings and social interactions among the tribals through Vana Samrakshana Samithi (VSS) activities.

Key Words : Social Training, Social Interaction, Social Skill, Social Organisation, Tribals

Introduction–The term 'social skill' broadly lies and is applied everywhere in the society. The social skills have acquired through the social trainings and social interactions. The majority of the social organisations have implemented social capacity building curriculum in their training modules. 'Bring into knowledge hub world' is the motto of every training. The marginalised and deprived groups do not get the chance to improve the socialization process because of lack of social training. According to Callon, the social growth attains when the economic and social intermediaries like knowledge text, technical objects, social skill and money are brought together and must properly be utilised. In this context, the term 'Sociology Translation' is appropriate to define the social growth through the social training and social interaction **(Oswald, Steve and Fred, 2001).**

Social Training and Social Interaction–Social training and social interaction are major pillars in the social skill building. Majority of them do not know how to act in the social platforms and how to grab the knowledge. Lack of social skills inhabits the quality of work, economic growth and socialization process in society. The output of social training and social interaction are proper setting of social visions and approaches, acquiring innovative knowledge, teamwork management, adaptability and social enabling. Social construct defines how the people construct their views towards the world. Social behavioural interactions influence the human behaviour and it is deeply associated with the social changes. Why do the majority of poverty alleviation missions, NGOs and social organisations have adopted social construction? The answer is very clear social construction concept can survive the change

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and more comfort with the environment of adaptability. Social construction triggers ought to act, make a sense and utilising the space. This is needed for the socio-capability approaches and for new globalisation era of world **(Jonathan,1990).** Social constructions reflect on how the people construct their views of world. Face to face, interactions, micro management, sociological perspective, dialogue delivery space, touching and eye contact are the components in social construction. Social interactions and behaviour can influence the human behaviours **(Arthur,2004).**

The concept of Participatory Forest Management (PFM) was one of the major outcomes of 1988 National Forest Policy. The design of Community Forest Management (CFM) is the proper tool for the forest protection with the support of forest nearby people and depending communities. Preserving, Conserving and Protecting the wildlife are the major aims of the Community Forest Management (CFM). The protection of the forest is through giving more powers and responsibilities to the local communities without disturbing flora and fauna. The Vana Samrakshana Samithi (VSS) is the village level body of Community Forest Management (CFM) and it is also known as Joint Forest Management Council (JFMC) in Kerala. The main aim of the Vana Samrakshana Samithi (VSS) is to protect the forest with the support of locals and those who are living nearby the forest areas. The VSS is the village level body which is being facilitated by the Forest Department Kerala. The Vana Samrakshana Samithi (VSS) teaches social enabling among the VSS members especially among the tribal VSS members. The members come out from their homes, sit together, and start interactions within their limits. This is the first phase of the social learning. This process has changed their life. Along with social learning they have started the banking habits, usage of technology and finally it has reached into livelihood income. The VSS activities have supported community awareness and employment programmes of the local people.

A Note on Study Area–The study is about the enhancement of the social training and social interaction among the tribal Vana Samrakshana Samithi (VSS) members at Vazhachal tribal colony through the VSS activities. The tribals of the Vazhachal tribal colony members are living mainly by depending on the forest. The Kadar tribal community tribals are lived in Vazhachal tribal colony. They are living nearby the Vazhachal waterfalls and their livelihood incomes are related to forest and VSS activities. Athirappilly-Vazhachal waterfalls areas are the famous Eco-Tourism areas in the Kerala Tourism destinations. 13 tribal colonies and 11 Vana Samrakshana Samitthis (VSSs) are included in Athirappilly-Vazhachal areas. Among the 13 tribal colonies Vazhachal tribal colony is selected for the study and among the 11 Vana Samrakshana Samithis (VSSs) Vazhachal Vana Samrakshana Samithi (VSS) is selected for the study. The total population of the Vazhachal tribal colony is 202 members. The males are 99 and female are 103.

Objective of the study

Overall Objective–To examine the role of social trainings and social interactions among the tribal Vana Samrakshana Samithi (VSS) members through Vana Samrakshana Samithi (VSS) activities in Vazhachal Eco-Tourism area.

Specific Objective

1) To study the educational background of the tribal VSS members at Vazhachal tribal colony.
2) To evaluate the computer knowledge and usage of internet among the VSS members at Vazhachal tribal colony.
3) To examine the banking habits among the VSS members at Vazhachal tribal colony.
4) To analyse the social training impact among the VSS members at Vazhachal tribal colony.

Statement of the Problem–Social structure and social behaviour are part of the human beings. Changes in life may occur due to the social changes. Evolving the values, new training methods, technological updating process, innovative visions, social movements, face-to-face interactions and different outlooks are the reasons for the social changes. Social changes can change the person and society. Social construction is the output of the social changes. Social trainings and social interactions influence the people to set their behaviour, polishing their personality and also shapes their objectives and makes a vision towards the world **(Jonathan,Saba,Michael, Kristin,Andrew and Holly,2014).**

.Vana Samrakshana Samithi (VSS) activities have supported social interactions and social trainings through various programmes. The VSS aims forest protection with the support of forest surroundings people and ensure livelihood income for these people**.(Dhanuraj,2006)** the study pointed that VSS activities have supported large level of community awareness programmes and also employment opportunities for the local people. The VSS members have a vital role in the eco-tourism areas. They promote clean and non-plastic environment. The VSS members are functioning with the support of Kerala Forest department.

Social organisations, social trainings and social interactions are mutually connected and the output of these connections is upliftment of human beings and society. When the interactions start, they come out from ignorance, fear and exploitations. Social organisations, social trainings and social interaction change the views towards the world. It teaches the realities and bounding relations in life. One who knows each and everyone sharpens the quality of leading capacity. Group formation, Collective bargaining capacity, active response, network building, resource mobilisations, convention practices, processuality and temporality grounding are the different dimensional process of social organisations. Interaction is an extensive method, which is used in the social organisation and social process. **(Peter,2003).** Social organisations, social trainings and social interactions have an active space in the empowerment especially in the women and tribal empowerment.

Tribal communities are different; it depends on tribal culture, identity, ecology, history and population. Different communities have different culture and practices and the application process of interactions are different. Tribals are heterogeneous in nature, the enhancement of the social process among the tribal communities varies on feelings, and bound, languages, collective action and group practices **(Arya, Tony and Riya, 2021).** Tribal culture depends on their rituals, customs, practices and language. The mainstream initiative among the tribes has erased their cultural and traditional sound knowledge'. The new generation tribes do not know their cultural and traditional knowledge'. The social trainings and interactions, must include their culture, traditional knowledge and tribe identity**. (Ranee,2014; Bodhi,2016)** This paper attempts to study the enhancement of the social trainings and social interactions among the tribes through the Vana Samrakshana Samithi (VSS) activities, trainings and interactions. The study tries to understand how far the trainings and interactions helped in building the improvement in communication skill, social interactions, updating general knowledge, socialization process, friends and relations, self-confidence and decreasing alcoholism among the tribes.

Significance of the Study–The activities like social trainings and social interactions of Vana Samrakshana Samithi (VSS) are highly commendable. Apart of forest protection and livelihood income, VSS working model gives more importance to the social enhancement and development of social process. Their functioning roles and methods are reached into marginalised groups, women and tribals. Many of the VSS groups are functioning under women leaderships with the support of Kerala forest department.

The VSS activities also promote the Eco-Tourism. According to this study, we can analyse how far the social trainings and social interactions of VSS have uplifted the qualities of tribal VSS members at Vazhachal Eco-Destination area.

Table. 1 Educational Background of the Respondents

Education	**Male Respondents**	**%**	**Female Respondents**	**%**	**Total**	**%**
Illiterate	7	14.0	8	16.0	15	15.0
Primary Education	24	48.0	20	40.0	44	44.0
Secondary Education	14	28.0	12	24.0	26	26.0
Higher Secondary Education	5	10.0	7	14.0	12	12.0
Graduation	0	0.0	2	4.0	2	2.0
Post-Graduation	0	0.0	1	2.0	1	1.0
Total	**50**	**100.0**	**50**	**100.0**	**100**	**100.0**

Source : Primary Data (2019-'20)

Table.1 indicates the educational background of the respondents. Among 100 respondents, 24 male respondents (48.0 Percentages) and 20 female respondents (40.0 percentages) are attained primary education. One female respondent (2.0 percentages) is attained Post-Graduation

Table.2 Computer Knowledge & Internet Literacy

Computer Literacy						
Computer Literacy	**Male Respondents**	**%**	**Female Respondents**	**%**	**Total**	**%**
Literacy	**4**	**8**	**6**	**12**	**10**	**10.0**
Mode of Internet Connection						
Internet Connection	**Male Respondents**	**%**	**Female Respondents**	**%**	**Total**	**%**
Mobile Wi-Fi Connection	38	76.0	41	82.0	79	79.0
Purpose of Internet Connection						
Purpose	Male Respondents	%	Female Respondents	%	Total	%
Social Media	12	31.6	18	43.9	30	37.9
Knowledge Updating	28	73.7	32	78.0	60	75.9
	38	100.0	41	100.0	79	100.0

You Tube						

Source : Primary Data (2019-'20)

Table:2 shows the computer knowledge and internet literacy among the respondents. Among the 100 respondents, 4 male respondents and 6 female respondents have attained the computer knowledge. About 76.0 percentages (38 male Respondents) and 82.0 percentages (41 female respondents) are using internet connection. Among the 100 respondents, 12 male respondents and 18 female respondents have social media account and 38 male respondents and 41 female respondents are watching You Tube through Wi-Fi internet.

Table.3 Banking Services Availed by the Respondents

Banking Services	**Male Respondents**	**%**	**Female Respondents**	**%**
ATM Card	50	100.0	50	100.0
Bank Loan	12	24.0	11	22.0
Gold Mortgage	7	14.0	12	24.0

Source : Primary Data (2019-'20)

Table.3 reveals the banking services availed by the respondents. About 100.0 percentages (50 male respondents and 50 female respondents) are used the ATM card. Among the respondents, 12 male respondents and 11 female respondents took the bank loan.

Table.4 Year of Starting Bank Accounts

Started Year	**Male Respondents**	**%**	**Female Respondents**	**%**	**Total**	**%**
2006-10	2	4.0	1	2.0	3	3.0
2011-14	10	20.0	13	26.0	23	23.0
2015-19	38	76.0	36	72.0	74	74.0
Total	**50**	**100.0**	**50**	**100.0**	**100**	**100.0**

Source : Primary Data (2019-'20)

Table.4 indicates the year of starting bank account by the respondents. About 76.0 percentages (38 male respondents) and 72.0 percentages (36 female respondents) started their bank account between 2015-'19 period.

Table.5 Schemes for Starting Bank Accounts

Started Through	**Male Respondents**	**%**	**Female Respondents**	**%**	**Total**	**%**
VSS	34	68.0	32	64.0	46	46.0
Scholarship	12	24.0	15	30.0	27	27.0
Pension	2	4.0	1	2.0	3	3.0
Personal Need	2	4.0	2	4.0	4	4.0
Total	**50**	**100.0**	**50**	**100.0**	**100**	**100.0**

Source : Primary Data (2019-'20)

Table.5 reveals the schemes for starting bank accounts. Among the 100 respondents, 34 male respondents (68.0 percentages) and 32 female respondents (64.0 percentages) started their bank accounts through Vana Samrakshana Samithi (VSS). About 24.0 percentages (12 male respondents) and 30.0 percentages (15 female respondents) started their bank accounts for scholarship purpose.

Table.6 ATM Card Literacy among the Respondents

ATM cardLiteracy	Male Respondents	%	Female Respondents	%	Total	%
Yes	19	38.0	15	30.0	34	34.0
No	31	62.0	35	70.0	66	66.0
Total	**50**	**100.0**	**50**	**100.0**	**100**	**100.0**

Source : Primary Data (2019-'20)

Table.6 indicates the ATM card literacy among the respondents. About 62.0 percentages (31 male respondents) and 70.0 percentages (35 female respondents) do not know how to operate the ATM card.

Table.7 Social Impact ThroughVana Samrakshana Samithi S Among the Respondents

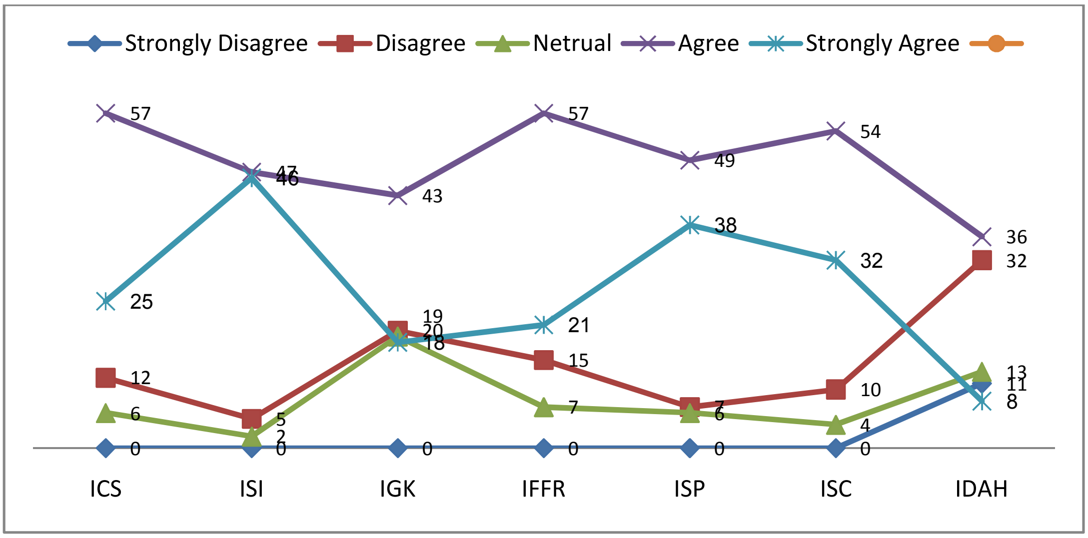
Variable	SDA		DA		N		A		SA	
	N	%	N	%	N	%	N	%	N	%
ICS	0	0	12	12.0	6	6.0	57	57.0	25	25.0
ISI	0	0	5	5.0	2	2.0	47	47.0	46	46.0
IGK	0	0	20	20.0	19	19.0	43	43.0	18	18.0
IFFR	0	0	15	15.0	7	7.0	57	57.0	21	21.0
ISP	0	0	7	7.0	6	6.0	49	49.0	38	38.0
ISC	0	0	10	10.0	4	4.0	54	54.0	32	32.0
IDAH	11	11.0	32	32.0	13	13.0	36	36.0	8	8.0

Source : Primary Data (2019-'20)

ICS	Improvement in Communication Skill
ISI	Improvement in Social Interactions
IGK	Improvement in General Knowledge
IFFR	Improvement in Friends and Family Relationships
ISP	Improvement in Socialization Process
ISC	Improvement in Self-Confidence
IDAH	Improvement in Decreasing Alcoholic Habit

Table : 7 reveals the social impact through the Vana Samrakshana Samithi (VSS) . Out of 100 respondents,57 respondents agreed that Vana Samrakshana Samithi (VSS) activities helped them in improvement in communication skill. Out of 100 respondents, 46 respondents strongly agreed that the Vana Samrakshana Samithi (VSS) activities helped them in improvement in social interactions. Out of 100 respondents, 43 respondents agreed that the Vana Samrakshana Samithi (VSS) activities helped them in improvement in general knowledge. . Out of 100 respondents, 57 respondents agreed that the Vana Samrakshana Samithi (VSS) activities helped them in Improvement in Friends and Family Relationships. Out of 100 respondents, 49 respondents agreed that the Vana Samrakshana Samithi (VSS) activities helped them in improvement in Socialization Process. Out of 100 respondents, 54 respondents agreed that the Vana Samrakshana Samithi (VSS) activities helped them in improvement in Self-Confidence. . Out of 100 respondents, 36 respondents agreed that the Vana Samrakshana Samithi (VSS) activities helped them in improvement in decreasing alcoholic habit

Fgurte.1 : Social Impact Through Vana Samrakshana Samithi (VSS) Among the Respondents



Source : Primary Data (2019-'20)

Operational Definition:Social Impact through Vana Samarakshan Samithi (VSS) Membership includes Improvement in Communication Skill (ICS), Improvement in Social Interaction (ISI), Improvement in General knowledge (IGK), Improvement in Family and Friends Relationships (IFFR), Improvement in Socialization Process (ISP), Improvement in Self-Confidence (ISC), Improvement in decreasing Alcoholic Habit (IDAH).

H0: There is no significant level of difference in social impact among the respondents after joining in Vana Samrakshana Samithi (VSS).

Table:8 Comparing sample based on the levels of agreement of Social Empowerment Impact through VSS

Variable	**Agree**	**Neutral**	**Disagree**	**□²**	**Sig.**
ICS	82	6	12	107.12	.000
ISI	93	2	5	160.34	.000
IGK	61	19	20	35.35	.000
IFFR	78	7	15	92.35	.000
ISP	87	6	7	128.07	.000
ISC	86	4	10	125.36	.000
IDAH	44	13	43	18.62	.000

Table.8 indicates that the summary of chi-square test of goodness-of-fit presented indicate that responses of the sample on ICS, ISI, IGK, IFFR, ISP, ISC and IDAH are significantly different, □^{2} =

107.12, 160.34, 35.35, 92.35, 128.07, 125.36 and 18.66, $p < .01$. Further, responses indicate that majority of the sample agreed on the improvement in ICS,ISI, IGK, IFFR, ISP, ISC. IDAH (N = 82,93, 61, 78, 87, 86, and 44). 43 % and 20% of the sample disagreed on the improvement in IDAH and IGK respectively.

Together, sample perceived the Vana Samrakshana Samithi (VSS) programmes are effective on social empowerment, social enabling and development of social process.

Therefore the hypothesis 'There is no significant level of difference in social impact among the respondents after joining in VanaSamrakshanaSamithi (VSS)'rejected whereas considering (a)Improvement in communication skill (ICS), (b) Improvement in social interaction (ISI), (c) Improvement in General Knowledge (IGK), (d) Improvement in friends and family relationships (IFFR), (e) Improvement in Socialization Process (ISP), (f) Improvement in Self-Confidence and (g) Improvement in decreasing Alcoholic Habits (IDAH).

Major findings of the study–Among the 100 respondents, 44 respondents have attained primary education. two female respondents have attained graduation and one female respondent has attained Post-Graduation. Among the respondents, four male respondents and six female respondents have attained the computer knowledge. Among the respondents, 38 male respondents and 41 female respondents are using internet. The Kerala forest department has provided free Wi-Fi internet connection for the VSS members. Only 12 male members and 18 female members have account in social media platforms. At the same time, 38 male respondents and 41 female respondents are watching You-Tube through Wi-Fi internet. These results show the how far the trainings of the VSS have enhanced among the VSS members. Among the 100 respondents, 38 male respondents and 36 female respondents started their bank accounts between 2015-'19 period. About 68.0 percentages (34 male respondents) and 64.0 percentages (32 female respondents) started their bank accounts through the Vana Samrakshana Samithi (VSS) membership purpose. Among the respondents, 50 male and 50 female respondents (100.0 percentages) have received the ATM card. But 31 male respondents and 35 female respondents do not know how to use the ATM card. Only 12 male respondents and 11 female respondents availed the bank loan. These result indicates the tribal respondents afraid to take loan because of lack of income and lack of collaterals. They think it would be affected in default in loan repayment.

Among the 100 respondents, 57 respondents agreed and 25 respondents strongly agreed that Vana Samrakshana Samithi (VSS) activities helped them in improvement in communication skill. Out of 100 respondents, 47 respondents agreed and 46 respondents strongly agreed that Vana Samrakshana Samithi (VSS) activities helped them in improvement in social interactions. Among the 100 respondents, 43 respondents agreed and 18 respondents strongly agreed that Vana Samrakshana Samithi (VSS) activities helped them in improvement in general knowledge. Out of 100 respondents, 54 respondents agreed and 32 respondents strongly agreed that Vana Samrakshana Samithi (VSS) activities helped them in improvement in self-confidence .The trainings and interactions through VSS have helped to improve various qualities in their life and shaped their personalities among the respondents. Among the 100 respondents, 57 respondents agreed and 21 respondents strongly agreed that Vana Samrakshana Samithi (VSS) activities helped them in improvement in friends and family relations. Out of 100 respondents, 49 respondents agreed and 38 respondents strongly agreed that Vana Samrakshana Samithi (VSS) activities helped them in improvement in socialization process. Among the respondents,. 36 respondents agreed and 8 respondents strongly agreed that Vana Samrakshana Samithi (VSS) activities helped them in improvement in decreasing in alcoholic habit. And 32 respondents also disagreed that Vana Samrakshana Samithi (VSS) activities not helped them in improvement in decreasing in alcoholic habit. The results show the importance of the socialization process through VSS activities. Once they engaged in various activities, they know each and everyone, discuss their issues and it leads better bounding relationships. Their unity in activities could campaign and make awareness on decreasing the alcoholic habit among the tribals.

Conclusion–Social trainings and interactions are most essential methods for grooming personalities in human social life. Come out from the ignorance, interact with the society, grab knowledge and experience by training. These four things are the key factors in determining the quality of life moving. Vana Samrakshana Samithi (VSS) is the one of the best social interaction platform for the tribals in Kerala. The first motto of the VSS is protecting the forest with the support of forest nearby people. Moreover, generate the livelihood income for these people. The Kerala Forest Department has coordinated various activities and trainings through VSS, especially for the tribal communities. Tribal communities are marginalised and they are not supposed to experience any kind of trainings. After introduction of VSS, the tribals come out from their hamlet and sit together, share their feelings, discuss matters of their life and find out livelihood incomes. They try to understand mutually and their problems also. One of the best outcomes of the VSS is women empowerment. The women coordinate and manage the meetings and activities with the support of forest department especially in tribal areas. These activities help the VSS members by improving in the communication skill, social interaction, general knowledge, better binding among friends and relatives, socialization process, self-confidence and decreasing alcoholic habit. Along with these trainings, the tribals have started the banking habits, using internet and social media platforms. The VSS activities have enhanced the life of VSS members especially in tribal communities by ensuring livelihood income and also social changes. Changes in social structure occur by social enhancements. Cultural changes happen because of adaption of new methods, evolving values, innovative concepts, technological updating and also global impacts.

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KUTAP

AN ENSEMBLE OF MUSICIANS

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SUSTAINABILITY IN RELATION TO GREEN GOVERNANCE ENVIRONMENT IN INDIA

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ABSTRACT

This article discusses the emerging concept of Green Governance, often known as Corporate Environmental Governance. Which may be described as "laying out the responsibilities of directors and establishing the board's responsibilities for all of the organization's stakeholders; included are the procedures and instruments that the organization employs to achieve its environmental objectives and the effectiveness of those processes and instruments in achieving the desired outcomes." It's essential to think about environmental, social, and economic issues when making decisions. Green governance and sustainable development help you do this. Green management and sustainability are different from other policies because they use the term "integration." Policymakers and those working in local government must, as a result, promote knowledge-based strategies such as information exchange, dissemination of best practices, improved compliance, and awareness-raising initiatives to achieve success. This paper talked about green governance, the environment, and the challenges of green management. Further, to show how the law and policy enforce, and then make suggestions for how it can be better.

I. INTRODUCTION

Sustainable environmental governance is a term used in political ecology and environmental policy to describe how the most important thing to remember when managing all kinds of human activities, including political, social, and economic, is to keep the environment in mind. Governance encompasses the activities of the government, business, and civil society, focusing on how to operate the whole system. Environmental governance often employs a variety of governance approaches, such as watershed-based management, to guarantee that all of these considerations are taken into consideration. Natural resources and the environment are seen as global public goods by those who subscribe to this school of thought, which means that they are things that remain unchanged even when they are shared. Everyone benefits from things like clean air, a stable climate, and biodiversity, ensuring that everyone is content with their lives. Others may still benefit from the natural resources that one individual desire. Non-rivalrous public goods are those that are available to everyone. It isn't easy to prevent someone from being successful. Because public goods are seen to be helpful, they have monetary worth. As a result, the concept of a worldwide public good is established. It only applies to things that a single individual or nation cannot destroy.

It is essential to manage these goods to stop both public and private people from hurting them. One way to think about how valuable a resource is is to price it. In this case, the good is water. "Environmental governance" is a term that refers to how people make decisions about the environment and natural resources. IUCN says that environmental governance is the "multi-level interactions" between the state, the market, and the public but is not limited to these three groups: the state, businesses, and citizens. These groups interact in formal and informal ways; they work together to make decisions about the environment (IUCN 2014).

II. REVIEW OF LITERATURE

Weian Li and Jian Xu (2018), The severity of environmental issues caused by humans has increased steadily over the past several decades, making global green governance an essential academic subject. People and the environment can work together more effectively if the appropriate governing structure and procedures are in place. Books on economics, society, and the environment have provided varying proof that these three factors are intertwined. On the other hand, few studies have looked at the balance of interests between humans and the environment from governance and policy. They can then achieve a balance between businesses' economic

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and green value. It is a very effective style of green management. It demonstrates how green administration works, including who the primary subjects are and how the procedures function. This article aims to provide a green governance framework that will assist enterprises, governments, social groups, the general public, and nature in their efforts to make the world a more sustainable place. A framework that combines ideas about green governance, innovation subjects, innovation processes, and innovation mode is examined in this research to determine how people and nature collaborate. To develop green governance rules that are appropriate for their nations. Each country or region must decide whether to employ the framework proposed or not. Green development plans that are economically and environmentally beneficial might be developed by businesses using the suggested framework.

III. OBJECTIVES OF THE STUDY

1) To study the concepts of green governance environment.
2) To examine the challenges of the green Governance environment.

IV. RESEARCH METHODOLOGY

The secondary data was collected from journal, Articles, conference proceedings and websites.

Importance of environmental governance

1. Making decisions and taking action that takes into account the environment.

2. Considering cities and communities, economic and political life, and the environment, not just as separate things.

3. Emphasizing how people are linked to the ecosystems in which they live.

4. Making it easier for people to move from open-loop/cradle-to-grave systems. Closed-loop or "cradle-to-cradle" systems are better than systems that don't have recycling (like permaculture and zero waste strategies).

Environment issues

The following main drivers of environmental degradation.

Economic growth: The development-centric perspective dominates most nations. International agencies call for sudden acceleration of economic growth. On the other hand, environmental economists argue for qualitative development as an alternative to evolution.

Consumption: Economic growth is mainly caused by the rise in consumption and the rise of the "consumerism cult," or the idea that people should buy things. Overdevelopment was thought to be the only way out of poverty in the past. Now, it's the goal in itself. But there aren't enough tools to stop this growth.

Destruction of biodiversity: There are so many different types of ecosystems on the planet that the extinction of any species has unintended consequences. The more damage there is to biodiversity, the more likely a chain reaction with unintended consequences will happen. Another big problem with the environment is deforestation, which falls under biodiversity loss. Despite the damage, many ecosystems have shown that they can bounce back. Environmentalists believe in the precautionary principle, which says that all actions that could be bad for the environment should be checked out.

Population increase: Forecasts indicate that the world's population will reach 8.9 billion people in 2050. It is a topic that mainly affects developing nations and impacts developed countries; although their population increase is slower, their environmental impact per person is far more significant.

Pollution: Another cause of environmental damage is the breakdown caused by fossil fuels. In the case of carbon-based fossil fuels like coal and oil that are burned, they release carbon dioxide into the air. Climate change is one of the most important effects of this. The Earth's temperature is rising at a steady rate. Because coal and oil are the most common fossil fuels, many environmentalists have a big worry.

Agriculture practices: It happens because farmers use too much fertilizer and overgraze their land, hurting the land. As a result, the soil is getting poorer, which causes silt to build up in rivers and lakes. Soil erosion is a process that keeps going on and on until the area is completely deserted. It isn't good, but it isn't the only thing that can happen to the soil. Chemicals used in farming can run off into rivers and make the water unhealthy.

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Challenge of environmental governance

The following Challenges facing environmental governance include:

1. There aren't enough continental and global agreements.
2. There are many problems with development, how much protection, and how much money can be used. It hurts the economy and makes it hard for Multilateral Environmental Agreements to be used (MEAs).
3. Environmental funding is not self-sufficient, so it takes resources away from solving problems to fight for funding.
4. The policies of different sectors don't match up.
5. Lack of institutional capacity
6. The priorities aren't clear.
7. The goals aren't clear.
8. There isn't enough coordination between the United Nations, the private sector, and civil society.
9. Without a shared vision, there is a lot of work to be done
10. There are connections between economic growth, trade, agriculture, food safety, and peace and security.
11. The World Trade Organization, for example, doesn't do enough to protect the environment (WTO).
12. There is a limit on how much credit an organization can get for projects in the Global Environment Facility (GEF)

The United Nations Environment Program (UNEP), the United Nations Development Program (UNDP), and the World Bank should work with MEAs.

The government can't keep up with its commitments to the MEA.

15. Environmental governance does not take into account gender and equity.
16. Inability to change public opinion.
17. It can take a long time for humans to impact the environment. It can be as long as a generation.
18. Environmental problems are part of complicated systems that we don't understand very well.

Climate change

The Intergovernmental Panel on Climate Change (IPCC) publications and the pronouncements of all significant US scientific groups, such as the National Academy of Sciences, indicate the scientific consensus on climate change.

Changes in solar irradiance and changes in the quantities of atmospheric trace gases and aerosols are two possible causes of climate change. Carbon dioxide (CO_2) concentrations in the atmosphere and land and sea surface temperatures may be used as indicators of climate change. - Vaporized water in the air Extreme weather and climate events' incidence or intensity There are a lot of glaciers around. Sea ice loss occurs at an accelerated rate, and sea levels rise. Climate models show that human actions, such as fossil fuel use, deforestation, increasing agricultural output, and the generation of xenobiotic gases, are to blame for rising temperatures and rising sea levels. National, regional, and worldwide efforts to lessen the effects of climate change are expanding. As part of a global effort to fight climate change, the Kyoto Protocol and the United Nations Framework Convention on Climate Change (UNFCCC) are essential. One hundred ninety-one countries signed the Kyoto Protocol to prevent climate change and encourage the decrease of greenhouse gases, mainly CO_2. Because industrialized economies create more significant emissions per person than developing economies, attempts to build a global response to this phenomenon are hindered if emissions in all nations are limited.

V. CONCLUSION

Institutional and non-institutional processes are becoming more critical to ensure the long-term sustainability of natural resources under rising strain from numerous dimensions of development. Therefore, it is believed that enhancing the governance process of evolution would help to improve the country's performance in terms of resource conservation and environmental management. There are many things the government of India does. Still, they are broken down into a few broad categories: global commitments, transparency and

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accountableness, sensitive ecosystems and conservation, water resources, research, education, and training in the country.

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