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STEPPING TOWARDS THE FUTURE HIGHER EDUCATION

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Abstract

Higher Educational Institutions have achieved meaningful progress across several educational paradigms. New Learners desire personal and adaptable learning routes based on levels of proficiency. As the Indian economy requires far more qualified workers than ever before, it is critical to link skills and higher education to societal goals. Internationally recognised institutions provide flexible choice-based interdisciplinary courses. Industry and University Collaborations equip graduates with a package of industry – ready skills.

Keywords: Education, India, Technology, Knowledge, Sustainability

Introduction

The goal and civic mission over the last half-century have been impacted by new pressures of maintaining standards in higher education to match the pace of the dynamic world. The goal of higher education is to gain new skills and prepare students for various careers and with a monumental shift, higher education institutions should strive to maintain a commonwealth society. This predicament has created ongoing debates regarding higher education's diversified landscape in the twenty-first century.

Competence is the fundamental tenet of international success in the World Trade

Organisation's regulation. It is evident that India should take advantage of its great capacity in ongoing professional development facilities and be ready to export the Indian brand of education to other countries. While, for the country, policy planning and emerging methods for this task are relatively new, this is an opportunity that India should not give up, as it provides exciting opportunities to boost its talent and intelligence.

In the second half of the twentieth century, economic development took place due to knowledge development and technological and scientific innovations. There was a transformation from mass production industry-based growth to knowledge-based growth. In this shift, complex and delicate innovation had a better market. In the past, the source of economic expansion was material and wealth creation, such as bountiful natural resources and cheap and plentiful labour.

Application of science and technology and use of 'knowledge' of information and management quality are the keys to productivity expansion (FICCI-EY Report, 2021). The ability to develop and apply this 'knowledge', which is critical to economic progress, is in high demand.

The advancement of information technology has broadened the areas of higher education, which is linked to enhancing the quality and the ability to reach a wide range

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of students. However, a new barrier in higher education is emerging across countries due to the information technology gap. At the same time, as information becomes globalised, economic globalisation accelerates as well. As multinational enterprises hold a dominant position, the economies of emerging regions are quickly influenced by global economic trends.

Need for a Paradigm Shift in Higher Education Policy

Higher Educational Institutions have achieved meaningful progress across several educational paradigms. The education industry worldwide, particularly in India, has been undergoing the most significant transition. Although the educational system has been progressively adapting and reacting to triggers such as evolving learner demands and emerging technology, the speed of change has increased due to the acceptance of the National Education Policy (NEP) in 2020.

Students' needs are constantly altering, which can be ascribed to the growing number of students who pursue their studies with a job or personal commitments. New learners desire personal and adaptable learning routes based on levels of proficiency. Higher education is currently in a similar predicament all around the world. It has quickened tendencies, specifically the shift to a digital economy. It has served as a test facility for Education 4.0, bringing self-directed learning and technological integration to life. NEP 2020 proposes a complete revamping of the educational system, including regulation and governance, to build a new system that is in line with the aspirational goals of 21st-century education while keeping true to India's

traditions and values. The online learning environment has changed India and the world. Academicians have begun to accept online degrees as a substitute for classroom learning and have given higher education institutions more leeway to include online learning in regular programmes. Many online learning organisations and universities worldwide are currently developing innovative online learning programmes, pedagogies, and content that provides a distinct student experience.

Need for an International Co-Operation in Higher Education

International educational institutions should be allowed to operate in India with the policies framed by the Indian authorities. It is significant because of the following reasons: improving human resource development; increasing the quality of Indian higher education by internationalising specialised research fields; reducing brain drain; promoting competitiveness; and attracting foreign education investment.

The NEP has identified several lofty goals like enhancing the quality of HEIs and ensuring India's status as a global education hub. Understanding student perspectives on NEP and how they perceive and accept it is critical to its successful implementation across the country. Challenges are still on their way as embracing a new model needs an inherent acknowledgement of the perception projected on the new model.

According to the Skill India-National Council of Applied Economic Research NCAER, 2018 report entitled "Skilling India, No Time to Lose", an estimation of over 1.25 million new Indian employees (ages

15-29) were predicted to join the workforce every month during 2022. Many jobs are insecure and redundant as a result of industry automation employing artificial intelligence and robotics. To meet short-term occupations that need technologically advanced skill sets, the global economy will require sophisticated workers and entrepreneurs (Lindqvist *et al.*, 2012). It is obvious that lack of employment security will have a significant impact on higher education, where a huge number of people must be taught the skills for the twenty-first century economy (Chan, 2016). As the Indian economy requires far more qualified workers than ever before, it is critical to link skills and higher education to societal goals. In recent decades, the growth of information technology has increased demand for technical training. However, due to a supply-demand imbalance and low employability of qualified students, the trend is shifting, leaving unfilled slots in technical education. Internationally recognised institutions provide flexible choice-based interdisciplinary courses. Industry and university collaborations equip graduates with a package of industry-ready skills. Indian universities also focus on Inter-Disciplinary Experiential Active Learning (IDEAL), which allows students to choose their own curriculum including majors and specialisations.

Over-Governance Demanded Harmonious Accreditation

Institutions in the country are overregulated due to the presence of many federal bodies, in addition to central and state governance for universities and colleges. The methods and processes of approval, affiliation, academic, and accreditation in the higher education system are complicated

(Agarwal, 2006). Even with such rigorous procedures in place, regulatory authorities are unable to fully manage fraudulent universities. In comparison to international standards, the quality of higher education is frequently questioned. There was a realisation that the UGC needed to be reformed to accommodate developing needs by bringing in members from other councils. Only 298 universities are affiliating (AISHE, 9th report (2018 -19), which adds to the administrative burden of approval, intake, syllabus revision, faculty recruiting, test and degree award. Participation in university academic changes, such as curriculum modification, is limited or non-existent for associated colleges (Vijayalakshmi, 2016). They only disseminate information, with skill-based training which is provided as a value-added service by a few select institutions (UGC, 2003). As the accreditation bodies and levels for technical programmes offered by universities and affiliated colleges varies, there is a difference in the breadth of educational objectives and curricular requirements of teaching learning process. The harmonisation of accrediting standards and the classified rating structure raises quality awareness among the general audience. There should be autonomy in all forums to create innovativeness and attain greater accountability in order to adapt to the new digital way of teaching-learning-employment scenario.

With 385 universities and an estimated 39931 colleges, the numbers of privately run institutions are growing (AISHE 9th report, 2019). The development of private participation was ascribed to decreased public sector spending and the introduction of self-financing courses in government institutions.

New private institutions, on the other hand, face significant impediments to attaining university accreditation and operating in the for-profit education system. When the private sector's current share is expanding, there is a neglect of its growth in policy reforms. In comparison to government institutions, private institutions receive fewer research funds. The government should identify and promote potential private actors to join in the nation's development.

While the competitiveness and survival of the fittest have been the key words in the educational sector, investment in consumer-centric capabilities, redesigning of policies, customised multiple outputs, capitalising on digital tools by harnessing the power of technology towards the progress of the learners and the institution, will be ways to support transformation in the higher educational sector (Sheikh *et al.*, 2017). It should be a win-win scenario where learners gain efficient grading, tangible results and institutions provide greater accessibility and affordability. Placing both on the trajectory path towards the future will need a shift in the digital ecosystem and pooling in of all stakeholders to meet the needs of the educational and industrial economy. Institutions, considered being the main educational hub across the globe, having to be restructured so that they do not wane off into a slumbering mode such that competitors catalyse the market place. An interesting shift which will propel the need of the hour by efficiency and reality based teaching learning scenario will hold the key to student-institution building.

Change happens and it is mandatory. Higher education is at the cusp of customising

itself to the needs of the customers. It has to be tailor made towards specific learning goals for mass adoption. A radical transformation with incremental changes and new pedagogical approaches will be lucrative and steal the light of the student masses (Sumanth *et al.*, 2016). It is time to bring in ground breaking research and immersive learning experiences amidst the tight rope walk at present (Kwiek, 2020). A proportionate inclusiveness of women at senior academic leadership levels would lead to the progress of the Higher Education Institutions at a larger level as they are bolster of the Nation's Economic growth who are natural born leaders (Teague, 2015).

The recommendations for future higher education include improving student experience and retention; incorporating virtual elements into the curriculum; creating a technology-driven curriculum feedback and redesigning strategy that is responsive to real-time learning and course correction; to integrate stakeholders into the curriculum to teach life skills; to make permanent infrastructures; to verify micro-credentials as a valid form of identification, a new educational concept to assist pupils in designing their own educational path; to increase the number of up-skilling and re-skilling possibilities available for lifelong learning through various delivery modalities like students and professors; to include elective credits in all programmes to assist students able to follow their passions (Lindqvist, 2012). National Education Policy should be a boon to the educational sector, and its successful implementation has to shape the young minds for a better tomorrow. Remote teaching, online teaching, virtual teaching...the choice is ours.

Conclusion

For a sustainable future of the nation, a change in the higher education policies is

required with the deployment of knowledge, skill-set, technology and human resource at all levels.

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FINANCIAL PERFORMANCE OF COCONUT TRADERS IN COIMBATORE DISTRICT

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Abstract

Agriculture is the backbone of Indian economy. Because one-third of the population depends on the agriculture sector. In Tamil Nadu, agriculture is a primary and traditional occupation of the people. In Tamil Nadu 56% of the population are farmers. Coconut cultivation and coconut trade provide sustainable revenue for farmers. India is the third-largest producer of coconut and coconut-based products. Tamil Nadu contributed the foremost area for coconut production. Tamil Nadu is the second largest state for coconut cultivation. In this context, a study on "Financial performance of coconut traders in Coimbatore district" was conducted. Pollachi taluk is a famous marketplace for agricultural products and Pollachi is also known as the Coconut Capital of Tamil Nadu. The main objective of the study is to assess the financial performance of the traders and also to analyse the profitability of their coconut business. The study was based on both primary data and secondary data. Primary data were collected using a structured interview schedule. Secondary data were collected from various books, journals, articles and websites. The tools used to analyze the collected data were namely trend analysis and Return on investment. The study

concludes that all the traders are increasing their investment for expansion and growth of the business. Most of the Coconut traders used own and borrowed fund in their business activities and managed in their own land for trade. The Coconut traders are very conscious to manage the business operations and pricing condition in the market and thereby able to increase their return on investment.

Keywords: Financial performance - Coconut traders - growth of the business - return on investment

Introduction

Coconut palm is one kind of palm tree. The term coconut is referred to the whole coconut palm that includes seed or fruit. The coconut term is derived from the 16th century Portuguese and Spanish word *coco*, the coconut is scientifically called *Cocos nucifera* Linn. *Coco*'s is a monotypic genus of the family *Areaceae*. All parts of the coconut tree are used for several purposes. The palm is originated from Southeast Asia, Indonesia, India, Australia, the Pacific Island, South America, Africa, the Caribbean and North America. Coconuts are cultivated in 86 countries across the world. India is the third-largest coconut producer in the world. In India, there are 10 states providing the

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foremost contribution to coconut production that is Tamil Nadu, Kerala, Karnataka, Andhra Pradesh, West Bengal, Odisha, Gujarat, Maharashtra, Bihar and Assam. Tamil Nadu contributes to 31 per cent of the total coconut production in India. Coconut is cultivated across 4.65 lakh hectares of land in the state. The plantings starts in Tamil Nadu during June - July. In Tamil Nadu, approximately 470.64 crore coconuts are produced from farming undertaken in about 4,35,621 hectares in 2019. In Tamil Nadu, Coimbatore district has the largest coconut production which yields more than 1200 million coconuts per year. According to the Coconut Development Board statistics 2017-2018, Coimbatore 87413 area (ha) produces 8038 lakh of nuts. The productivity per hectare is 9195 coconuts. Coimbatore district accounts for 20 per cent of the state's total area under coconut cultivation.

The economic development of the nation mainly depends on agricultural and industrial sector. Coconut is a leading commodity in agricultural export in India. According to the Coconut Development Board, the area of coconut production in Tamil Nadu is 437.34(000 hectares). In Pollachi Taluk agriculture is the major employment and the majority of people depend on agriculture and are engaged in coconut cultivation. Farmers have little control over their production as also over marketing. But now a day's farmers use scientific practices of cultivation. There is an ample scope for the export of coconut products in India. Coconut and coconut related products have a worldwide demand so coconut traders are having the opportunity to

trade worldwide. Every entrepreneur expects some return on their investment. Coconut traders must have knowledge about coconut market conditions and use technology to develop their business to gain profit. Coconut traders are facing some problems in their business. They have the capacity to overcome their business problems and run successfully. Every trader should be satisfied with their business financial performance. The present study focuses on assessing the financial performance and profitability of coconut traders and there by evaluating the satisfaction level of coconut traders.

To understand the research problem in depth various studies were undertaken. This helps to have a comprehensive/ understanding of the proposed study.

Theerkhapathy and Chandrakumar-mangalam (2014) analysed Coconut Processing Industries and suggested that coconut processing and related activities generate employment opportunities for over two million people in India. The contribution of the coconut oil to the national edible oil pool is 6%. In addition the coconut trade contributes Rs.7000 crores annually to the Gross Domestic Product (GDP). Sathya & Muruges (2015) in their report on "Agricultural Marketing with Special Reference to Coconut Marketing in Pollachi Taluk" concluded that coconut trading is profitable venture for all categories of the traders and also provides more employment opportunity to the rural people. Yamuna & Ramya (2016) in their study on "Coconut Cultivation and Marketing in Pollachi Taluk" revealed that coconut cultivation

is profitable and government should take necessary step to regulate coconut marketing process. Govindasamy (2018), in his report on production of coconut in Coimbatore district, emphasized that coconut cultivation is benefit for cultivators who are dealing in coconut trade.

Methodology

Research methodology followed in this study are given below:

Area of study

The study was carried in Pollachi Taluk, Coimbatore District. The study has covered 10 villages under Pollachi Taluk.

Sample selection

This study is undertaken to know the “The financial performance of Coconut Traders in Pollachi Taluk”. A non-probability sampling procedure namely convenient sampling method was used to select the respondents for the study (Table 1).

Table 1. Sample Size

Areas	Villages	No. of Respondents
Pollachi North	Mannur	7
	Thippampatti	7
	Vadakkipalayam	7
	Periyapodu	8
	Marchinaickenpalayam	7
Pollachi South	Ambarampalayam	7
	Unjavelampatti	7
	Z.Kottampatti	7
	Athupollachi	7
	Naickenpalayam	7

Period of study and Sources of data

The study was conducted during the period from December 2019 to April 2020, the required primary data was collected through an interview schedule and secondary data from journals.

Tools Applied

The descriptive statistics, Garret Ranking Techniques, trend analysis, return on investment ratio and Likert scaling technique was applied.

Limitations of the Study

1. The research is limited to Pollachi Taluk due to geographical and time limitation.
2. The study is limited to the size of the sample due to the time and cost factors.

Results and Discussion

The current study aims to know the financial performance of coconut traders in Pollachi Taluk. This deals with the analysis and interpretation of the collected data. In order to obtain the objectives of the study, the collections have been classified and analyzed with the relevant tools and techniques and presented under the following headings.

Socio-Economic Profile of the Respondents

The above table 2 reveal that majority of respondents are male, aged from 31-40 years and 41-50 years, and have completed their school level of education. Their family income per annum is ₹ 2,00,000 - 4,00,000.

Table 2. Socio-Economic Profile of the Respondents

Particulars		No. of Respondents	Percentage (%)	Cumulative Percentage (%)
Age	20-30 Years	15	21.1	21.1
	31-40 Years	20	28.2	49.3
	41-50 Years	20	28.2	77.5
	Above 50 Years	16	22.5	100.0
Total		71	100.0	
Gender	Male	67	94.0	95.0
	Female	4	6.0	100
	Total	71	100.0	
Marital Status	Married	55	78.0	78.0
	Unmarried	16	22.0	100.0
Total		71	100.0	
Educational Qualification	Up to School Level	40	56.3	56.3
	Undergraduate	25	35.2	91.5
	Postgraduate	6	8.5	100.0
Total		71	100.0	
Family Income per Annum	Below Rs 2,00,000	2	2.8	2.8
	₹ 2,00,000-4,00,000	23	32.4	35.2
	₹ 4,00,000-5,00,000	29	40.8	76.1
	More than ₹ 5,00,000	17	23.9	100.0
Total		71	100.0	

Source: Primary data

Business Profile of the Respondents

Overall, it is understood from Table 3, that the majority of the respondents are aware of the business information

through friends and relatives, the majority doing coconut copra business and having the business experience of five to ten years.

Table 3. Business Profiles of the Respondents

Particulars		No. of Respondents	Percentage (%)	Cumulative Percentage (%)
Awareness of Business Information	Through Friends and Relatives	52	73.2	73.2
	Through Radio And TV	12	16.9	90.1
	News Papers	7	9.9	100.0
Total		71	100.0	
Kinds of Business	Export	6	8.5	8.5
	Coconut Wholesale	27	38.0	46.5
	Coconut Copra	33	46.5	93.0
	Coconut Oil	5	7.0	100.0
Total		71	100.0	
Experience in the Business	Minimum Five Years	17	23.9	23.9
	Five-Ten Years	28	39.4	63.4
	Above Ten Years	26	36.6	100.0
Total		71	100.0	

Source: Primary data

Methods used by the Respondents to Increase Profit

Profit describes the financial benefit understood when the revenue is generated from business activity. The main reason for every business concern is to make profit.

The below table 4 exposes that 60.6 per cent of respondents were able to purchase raw materials at optimum price to increase profit, 14.1 per cent of respondents use optimum level of labour and optimize trade on equity to increase profit and 11.3 percentage of respondents were able to control the transportation cost to increase profit.

Table 4. Methods Used by the Respondents to Increase Profit

Particulars	No. of Respondents	Percentage (%)	Cumulative Percentage (%)
Control The Transportation Cost	8	11.3	11.3
Use of Optimum Level of Labour	10	14.1	25.4
Purchase Raw Material in Optimum Price	43	60.6	85.9
Optimize Trade on Equity	10	14.1	100.0
Total	71	100.0	

Source: Primary data

Comparative Statement of Growth of Investment in Coconut Business

Investment is the act of putting money to work to start or expand a business or

to trade goods, with the goals of earning income or capital appreciation. The growth of investment is necessary to expand the business for achieving its goals of business.

Table 5. Comparative Statement of Growth of Investment in Coconut Business

Years	Coconut Export (%)	Coconut Wholesale (%)	Coconut Copra (%)	Coconut Oil (%)
2015	100	100	100	100
2016	106.6	118.5	115.54	125
2017	117.4	134.8	129.1	148.2
2018	129.2	150.6	146.4	171.8
2019	138.4	168.6	175.8	194

Source: Primary data

The above table indicates the comparative statement of growth of investment in coconut business. For all the businesses, 2015 is a base year and the percentage is taken as 100. The percentage of growth of investment is increased. The investment in the coconut export business grown by 38 per cent, growth of investment in the coconut wholesale business is increased by 68 percentage. The investment in coconut copra increased by 78 per cent and in the case of coconut oil business is 94 percentage.

Among the different kinds of business coconut oil business proprietors investments has grown tremendously.

Source of Investment for the Different Coconut Traders

Investment is the key factor of every business. Coconut traders used own fund as well as borrowed fund. The following table 5 reveals the source of investment used by coconut traders.

Table 6. Source of Investment for the Different Coconut Traders

Particulars	No. of Respondents	Percentage (%)	Cumulative Percentage (%)
Own Fund	7	9.9	9.9
Both Own and Bank loan	53	74.6	84.5
Own and Loan from Friends and Family	11	15.5	100.0
Total	71	100.0	

Source: primary data

The above table 6 reveals that 9.9 percent of respondents have invested their own fund in the business, 74.6 percent of respondents

used both own fund and borrowed fund and 15.5 per cent of respondents have used own fund and amount borrowed from friends

and family. Source of investment is the most important for the respondents and it is understood that more than 90 percentage of the respondents employed both own fund and borrowed fund and have good trading on liquidity.

Comparative Statement of Return on Investment in Coconut Traders

Return on investment is a performance measure used to evaluate the efficiency of the business and its capacity in managing the business.

Table 7. Comparative Statement of Return on Investment in Coconut Traders

Years	Coconut Export (%)	Coconut Copra (%)	Coconut Whole Sale (%)	Coconut Oil (%)
2015	38.4	40	39	35
2016	40.3	40.5	41	30
2017	39.2	41	40	35
2018	42	46	41.7	35.8
2019	42.8	47.7	43.2	42

Source : Primary data

The above table 7 shows the return on investment of different kinds of traders of coconut business. According to the above table return on investment coconut export business is fluctuating earlier years and slowly increasing in the latter years. The return on investment for coconut whole sale business is increasing slowly. For coconut copra business return on investment has highly increased and for coconut oil business return on investment shows an increasing trend. Overall

the traders doing different kinds business are earning considerable profit and traders of copra business earning little higher profit followed by coconut whole sale traders.

Methods Used by the Respondents to Increase Profit

Profit describes the financial benefit realized when revenue generated from a business activity. The main motive of every business concern is to earn profit.

Table 8. Methods Used by the Respondents to Increase Profit

Particulars	No. of Respondents	Percentage (%)	Cumulative Percentage (%)
Control the Transportation Cost	8	11.3	11.3
Use of Optimum Level of Labour	10	14.1	25.4
Purchase Raw Material in Optimum Price	43	60.6	85.9
Optimize Trade on Equity	10	14.1	100.0
Total	71	100.0	

Source: Primary data

The above table 8, exposes that 60.6 percentage of respondents able to purchase raw materials at optimum price to increase

profit, 14.1 percentage of respondents use optimum level of labour and optimize trade on equity to increase profit and

11.3 percentage of respondents able to control the transportation cost to increase profit. It can be concluded that the respondents are able to increase their profit by purchasing raw material at optimum price.

Problems Faced by the Respondents

Problems are the part of business. No business or trade runs without facing problems. Assuming risks and facing the business problems are important characteristics of business.

Table 9. Problems Faced by the Respondents Based on Garret Ranking Techniques

Particulars	Total	Mean Value	Ranking
Price Fluctuations	532	7.49	1
High Cost of Input	481	6.77	2
Investment	453	6.38	3
In-Adequate Labour Availability	434	6.11	4
In-Adequate Transportation Facility	354	4.98	5
Lack of Market Information	265	3.73	6
In-Adequate Storage Facility	261	3.67	7
Exploitation By Middlemen	247	3.47	8
Absence of Co-Operative Society	168	2.36	9

Source: Primary data

It could be observed from the table that traders finds price fluctuation as a most important problem ranked as first, followed by high cost of input ranking second, investment as third rank, inadequate labour availability ranking fourth, inadequate transportation facility ranking fifth, lack of market information sixth, inadequate storage facility seventh, exploitation by middlemen eight and absence of co-operative society the least.

Satisfaction Level of the Respondents

Satisfaction in the business is an important criterion for continuing same in future. The following table 10 indicates the satisfaction level of the coconut traders.

Table 10. Satisfaction level of Coconut Traders

Factors	Total Score	Score Value
Raw Material Availability	301	4.24
Market Opportunities	264	3.71
Purchasing Power	255	3.59
Income Earning	243	3.42
Investment Sources Availability	234	3.29
Price Fluctuation of the Market	220	3.09
Storage Facilities	212	2.98
Transportation Facilities	210	2.95
Labour Availability	204	2.87
Cost Control	202	2.84
Taxation	140	1.97
Government Policies Subsidy	119	1.67

Source: Primary data

From the above table 10, it is a clear indication that coconut traders are very much satisfied with availability of the raw materials score value 4.24, followed by market opportunities score value 3.71 and the traders not satisfied with taxation and subsidy policies of government.

Summary and Conclusion

Majority of the traders in Pollachi Taluk engaged in the agricultural field and depends on agriculture for their economic needs. In Pollachi Taluk mostly people

engaged in coconut based business. Coconut traders engaged in export of the coconut and coconut based products. Some traders carry out coconut copra, coconut wholesale, coconut oil business. The study reveals that all the traders are increasing their investment for expansion and growth of business. The study evaluated the satisfaction of certain functional aspects of coconut traders and found that coconut traders are improving and expanding their business and earning profit indicating their satisfactory financial position.

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EXTRACTION AND CHARACTERIZATION OF PHYSIO-CHEMICAL, MECHANICAL PROPERTIES OF *Curcuma longa* PETIOLE FIBRE

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Abstract

In this research, the chemical and mechanical properties of *Curcuma longa* petiole fibre are studied to investigate the possibilities of using this fibre in technical textile applications. The processing for the extraction of fibres from the petiole of the *Curcuma longa* L. plant was explored. The chemical composition (cellulose, lignin, and hemicellulose content), physical properties, and mechanical properties of the resulting fibres were all determined. The chemical composition reveals that the *Curcuma longa* petiole fibre has a cellulose content of the order of 20.05 (wt%), which is similar to that of other lignocellulosic fibres. The lignin content of 6.8 (wt%) of *Curcuma longa* petiole fibre is low compared to other natural fibres. Fourier transform infrared spectra (FTIR) and X-ray diffractometry of extracted fibres revealed the same chain conformation. X-ray diffractograms revealed that cellulose I is the main crystalline component. Concerning physical and mechanical properties, raw fibres were characterised by the highest crystallinity (28%). They are also stronger and less extensible than the other fibers. In

this paper, it shows the effects of mechanical and physical properties of *Curcuma longa* petiole fibre that have been extracted by the mechanical retting method.

Keywords: Chemical composition, lignocellulosic, FTIR, X-ray diffractometry, thermal analysis, etc.

Introduction

In recent years, global environmental issues and inadequate raw fibre resources have led scientists worldwide to show an interest in exploiting the full potential of natural fibres and their diverse uses (Schuh & Gayer, 1997). Flax and hemp, for example, are the most attractive natural cellulosic fibres in Europe (Peijs, 2000). The other natural fibres influenced by, such as jute, sisal, and coir, to a lesser extent, is more extensively reported in the literature (Chand *et al.*, 1998). There are many other less studied cellulosic fibres that are attractive in terms of their morphology, their intrinsic properties, or their cost. The origin of *Curcuma longa* is from southern Asia, most probably from India. *Curcuma longa* does not occur in a true rough state, although in some regions it looks to have

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become naturalized. It is a sterile triploid and is thought to have arisen by continued selection and vegetative propagation of a hybrid between the diploid wild turmeric (*Curcuma aromatica* Salisb. native to India, Sri Lanka, and the eastern Himalayas) and another closely related tetraploid *Curcuma* species. This fibre has relatively important textile potential Msahli *et al.* (2006) and it is a promising candidate as fibre reinforcement for resin matrix composites (Chaabouni, 2005). It is worth noting that, although *Curcuma longa* L. petiole fibres have some characteristics in common with other ligno-cellulosic fibres, their properties have not yet been fully described. Thus, to enable their use in technical textile applications, the basic aspects of their structure and morphology, such as chemical composition, crystallinity, density, as well as tensile and mechanical properties, must be analysed. This work aims to characterise the physico-chemical properties of *Curcuma longa* L. petiole fibres.

Methodology

Materials

Curcuma longa L plants were collected from Tirupur, district, Tamil Nadu, India. The plant is a perennial herb and a member of the *Zingiberaceae* family, and is cultivated mostly in India and China (Labban, 2014). The plant has enormous, lily-like leaves that can grow up to 1.2 metres long. The inflorescence is 10-15 cm long, looks like a cone, and is attached to a stem enclosed in a sheath of petiole (Ahmad *et al.*, 2010). The native plant is cultivated in India, West Pakistan, China, Malaysia (Yamuna Devi *et al.*, 2019)

and other tropical regions of Southeast Asia (Thomas, 2000). They are light green in colour, 30-40 cm long, and 8-12 cm wide (Ross, 2001). Given the vast range of uses for turmeric, it is worthwhile to cultivate the plant on a large scale. This will help poor and landless farmers improve their financial situation.



Fig 1: *Curcuma longa* plant petiole

Extraction of *Curcuma longa* petiole fiber

Natural fibres are extracted from the plant by various techniques like mechanical retting, chemical retting, and water retting (Kommula *et al.*, 2013) The CLPF was extracted by the mechanical retting process, where the *Curcuma longa* petiole plant was combed by using a metallic brush in a traditional combing process. Then the stems were shadow dried in the open air to remove the moisture content (Binoj *et al.*, 2015).

Characterization of *CLPF*

Chemical Analysis

The chemical analysis of *CLPF* was determined by using a standard method. All the *Curcuma longa* fibre samples were dried in an oven with air circulation at 60°C for 24 hours in order to eliminate the moisture content (Mendes, *et al.*, 2015). The lignin content of *CLPF* was measured as per standard method D1106-96 as the Klason method. The amount of cellulose in the curcuma stem fibres was determined using the acid detergent fibre method according to AOAC method 973.18 (Reddy & Yang, 2007). The ash content of the *CLPF* was determined according to the ASTM E 1755-01 method. The *CLPF*, holocellulose was determined according to the method described by Wise *et al.* (1946). The hemicellulose fraction was calculated as the difference between the -cellulose and holocellulose content present in *CLPF*. Five replications of *CLPF* were simultaneously measured and their average values were defined as the standard result.

FTIR Analysis

The fundamental characterization of function groups and the behaviour of *CLPF* chemical bonds were determined by TENXO27 using an infrared spectrometer in the PR mode with a scanning rate of 32 scans min⁻¹ and a resolution of 2 cm⁻¹ (Natarajan *et al.* (2016). The functional groups and their molecular bond structures in the

wave length range of 4000 cm⁻¹ to 500 cm⁻¹ were analysed at room temperature (Bakri & Jayamani, 2016).

Single Fibre Strength Analysis

Tensile properties such as maximum stress, young's modules and percent elongation at break were analysed using a universal tensile tester machine at a cross head speed rate of 10 mm/min with a load cell capacity of 1 KN. The tensile test was performed for 20 single fibre samples having uniform gauge lengths of 50mm each with 65% of relative humidity at 21°C as per the ASTM D3822 Standards (Arthanarieswaran *et al.*, 2015).

Morphological Studies

SEM Analysis

Scanning Electron Microscopic (SEM) studies of raw *Curcuma longa* petiole fibers were carried out on FFI Quanta 200 to observe the surface structure of the fibre (Singha, *et al.*, 2009). The materials are non-conducting. To achieve good conductivity, all samples were first carbon sputtered followed by sputtering a gold/palladium mixture before examination. A high-beam of electrons with an accelerating voltage of 25KV was used to scan the sample with a vacuum level of 1.510-3pa (Indran *et al.*, 2014). The resulting images had a great depth of field. A remarkable 3D appearance with high resolution was obtained (Singha *et al.*, 2009).

X-Ray Diffraction Spectroscopy

The powdered samples were subjected to X-ray diffraction in Shimadzu with monochromatic Cu α radiation to determine the crystallinity index (CI) and crystallite size of the *CLPF* (Mayandi, *et al.*, 2016). The radiation source operates at a current of 30 mA with an accelerating voltage of 40 kV. The samples were scanned in the 2θ range between 10° and 90° at a rate of 10 per minute in order to obtain an acceptable diffraction pattern. The crystallinity index was calculated by the de-convolution method, which separates amorphous and crystalline contributions from the diffraction spectrum (Vignesh *et al.*, 2016). The crystallographic plane using Scherer's formula

$$CS = \frac{K \lambda}{\beta \cos \theta} \quad - (1)$$

K = Scherer Constant (0.84)

λ = X-ray wavelength (0.154nm)

β = peaks full width half maximum

θ = Bragg angle

Thermo gravimetric analysis

The thermal stability of *CLPF*, was probed with the help of a thermo gravimetric analyzer (Fan *et al.*, 2012). Thermal degradation was examined in terms of global weight loss using a thermal analyser [model NETZSCH STA449F3]. To avoid oxidation effects, the TGA analysis was carried out

in a nitrogen atmosphere at a flow rate of 20 ml/min (Ramanaiah *et al.*, 2011). The instrument consists of a furnace in which ten milligram's of fibre sample are placed on an alumina crucible supported by a precision balance. The samples were heated slowly over the temperature range from room temperature to 1000 C with a heating rate of $30^\circ\text{C}/\text{min}$.

Fiber length and diameter

The length of a fibre was analysed using an advanced instrument but was not possible due to the brittle nature of the fibre. The calibrated steel scale is used to measure the fibre length manually. The diameter of a fibre was measured in SEM photography of an individual fibre taken along the longitudinal direction. Ten different fibre samples were tested to get an accurate result (Vignesh *et al.*, 2016).

Results and Discussion

FTIR Analysis

The summarised functional group of *Curcuma longa.L.* Petiole fibers spectrum as illustrated in Fig. 2 has wavenumbers from 4000 to 500 cm^{-1} . The unique features of *Curcuma longa.L.* Petiole fibers spectrum are due to its contents such as cellulose, hemicellulose, and lignin. FTIR spectra show seven well-defined peaks for *CLPF* at 3390, 2968, 1593, 1392, 1066, 657 and 543 cm^{-1} and the peak at 3390 cm^{-1} O-H stretching vibration of cellulose and hemicellulose. The peak at 2968 cm^{-1}

in the *Curcuma longa.L.* Petiole fibres indicate the presence of C-H stretching vibration, which occurs due to the vibration of cellulose. The peak at 1593 cm^{-1} in the *Curcuma longa.L.* petiole fibers, C=C stretching indicates the presence of lignin, NH bend and the peak at 1392 cm^{-1} belongs to the phenol or tertiary alcohol and OH bend. The peak at 1066 cm^{-1} in the *Curcuma longa.L.* petiole fibres has indicated the presence of cellulose by showing a C-H stretch of aromatic compound. The peak at 657 cm^{-1} occurs in C-OH out-of-plane bending and 543 cm^{-1} belongs to the C-H stretch of alkynes and aliphatic compounds.

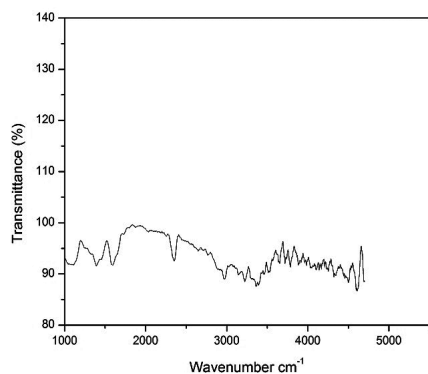


Fig. 2. FTIR analyses of *Curcuma longa.L.* Petiole fibers

Chemical Composition

The properties of natural fibres are based on their chemical composition. The chemical composition of the natural fibres was highly influenced by the climate, region, soil condition and maturity of the plant and its extraction process (Ramaniah *et al.*, 2011). The *Curcuma longa.L.* petiole fibres contain cellulose (20.05 wt%) whose tensile strength, modulus and elongation at break depend on the cellulose content. The hemi cellulose of *CLPF* is 53.95 wt% which acts as a reinforcement matrix between the cellulose microfibrils and forms the cellulose / hemi cellulose network. The lignin 6.8 wt% acts as a protector against biological attack and gives rigidity to the plant. The increased ash content of 4.6 wt% decreases the fire resistance characteristics and eliminates amorphous elements (Gopinath *et al.* 2015). Table 1 shows the comparative chemical analysis of different agro-wastes (Annapoorani 2017).

Table 1. Comparative Chemical Analysis of Different Agro Wastes

Fiber Name	Cellulose	Hemicellulose	Lignin	Ash	Holocellulose
<i>Curcuma Longa</i>	20.05	53.95	6.8	4.6	74
Cotton stalk	45.5	19.3	18.2	2.52	75.6
Rice straw	70.9	30.7	17.2	16.6	70.9
Rya straw	74.1	16	15.4	3.2	74.9
Corn straw	39.0	42.0	7.30	24.9	82.1

Fibre strength is mostly considered to be next to fibre length and fineness in order of importance amongst fibre properties (Kant *et al.* 2013). The tensile strength of *Curcuma longa.L.* petiole fibres are shown in Fig.3. The tensile properties such as modulus and elongation at break of *Curcuma longa.L.* petiole fibres are also tabulated in Table 1. It can be clearly seen from that *Curcuma longa.L.* petiole fibres follow brittle fracture naturally. The average value of ultimate tensile strength of the *Curcuma longa.L.* petiole fibres were found to be 1060-7090 MPa. When compared with other natural fibres like wild date palm, veldt grape (Mayandi *et al.*, 2014), tamarind (Reddy *et al.*, 2014) and Borassus (Reddy *et al.*, 2009). *Curcuma longa.L.* Petiole fibres had better tensile strength. Moreover, the tensile young modulus of these fibres is also comparable with other natural fibers. The young modulus and the elongation at break of *Curcuma longa.L.* petiole fibres were found to be 34.18 MPa and 1.6% respectively.

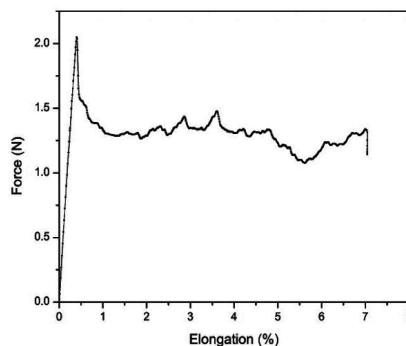


Fig 3: Single fiber strength of *Curcuma longa .L.*Petiole fibers

Scanning Electron Microscope

A morphologystudyof*Curcuma longa.L.* petiole was carried out using Scanning Electron Microscopy (SEM) to evaluate the fibre surfaces which is shown in Fig. 4(a). The changes in morphology are important to predict fibre interaction with the polymer matrix in reinforced composites (Marcia *et al.*, (2009). In is consists of several elementary fibres such as fibrils or fibre cells joined together in the direction of their length by pectin and the other non-cellulosic compounds (Yamuna Devi, 2021) to form a

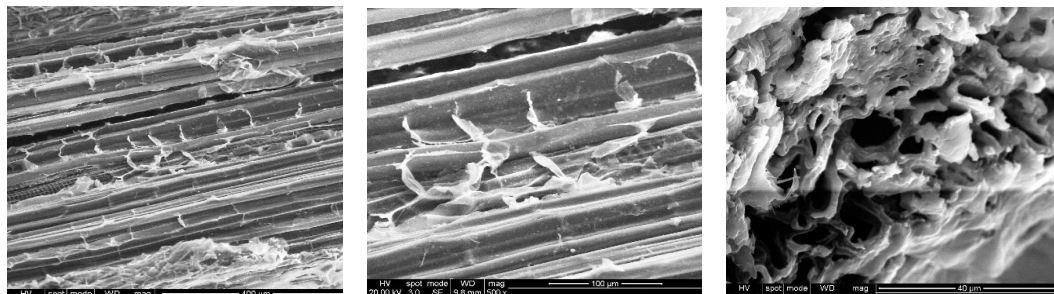


Fig. 4. Scanning electron micrographs of *Curcuma longa .L.* Petiole fibers – (a) 200x, (b) 500x & (c) 2000x.

certain diameter. At a higher magnification in fig. 4. Clear smooth surfaces with lots of impurity substance and fibrils bound together by hemicellulose can be seen. This roughened surface may improve interfacial bonding where the obtained *Curcuma longa* fibers are used as absorption material and filters and in polymeric composites. The cross sections of this fibre are shown in Fig. 4(c). They have a roughly cylindrical structure. It indicates that the fibers have a multicellular structure. The cells are roughly circular in native but do not have uniform dimension (Uma Maheswari *et al.*, 2008).

X-Ray Diffraction

The fibre properties are influenced by two important qualities, such as the degree of fibre orientation and crystallinity index (Manimaran, *et al.*, 2016). The crystalline percentage and the size of the fibre sample were determined by wide-angle X-Ray diffraction (WAXD). The demonstrative X-ray diffraction spectrum from *Curcuma longa.L.* Petiole fibres is shown in fig.6. It shows two well-defined peaks at $2\theta=15.01^\circ$ and $2\theta =22.06^\circ$ and these diffraction peaks indicate that the fibre is semi-crystalline. The crystallographic planes (101) and (002), which represent the crystalline peaks of cellulose, are usually observed for natural fibers and other peaks indicate the presence of impurities (Indran *et al.*, 2014).

$$CI = \frac{I_{\max} - I_{\min}}{I_{\max}} \times 100 \quad - (2)$$

Where I_{\max} – Indicates maximum intensity of the crystalline fraction

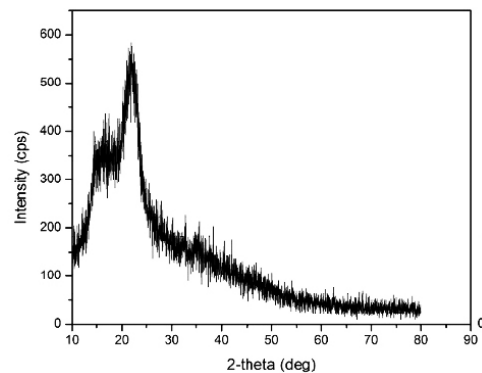
I_{\min} -Indicates minimum intensity of the amorphous fraction

The crystalline index of *Curcuma longa* fibre CI is 28%. This value is lower than other natural fibers.

CS indicates the fibre crystallites using Scherer's formula

$$CS = \frac{K \lambda}{\beta \cos \theta} \quad - (3)$$

Where $k=0.94$ is Scherer's constant, β is the peaks full width half maximum (FWHM) and λ is the wave-length of the radiation. The crystalline size was calculated as 0.5 nm for the first peak crystallographic plane (101) and 12.9 nm for the second peak crystallographic plane (002). The water absorbed more in the lower crystal size structure compared with higher crystal size structure.



**Fig 5: X-Ray diffraction for *Curcuma longa*.
Petiole fibers**

Thermal Analysis

The primary thermogram of *Curcuma longa.L.* petiole fibres are shown in Fig.6.

It is evident that the thermal degradation of *Curcuma longa.L.* petiole fibres occur in three stages. The thermal degradation of the first stage was due to the evaporation of mixture (Uma Maheswari *et al.*, 2008). The thermal degradation of the second stage started at 340°C and the final stage of mass loss occurred at 998.8°C. This stage corresponds to the degradation of alpha-cellulose and lignin in *Curcuma longa.L.* petiole fibers. The thermal stability of *Curcuma longa.L.* petiole fibres are compared with natural fibres like Napier grass fibre, Tamarind and Borassus. From this TGA curve, it can be clearly seen that *Curcuma longa.L.* petiole fibres are thermally stable up to 340°C. It has higher thermal resistance. It is used for acoustic composite panels.

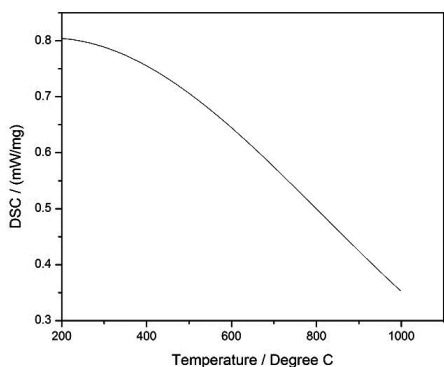


Fig 6: Differential Scanning Calorimeter of *Curcuma longa.L* Petiole fibers

Fiber Length and Diameter

The length of the fibre depends upon the fertility of the soil (Hartemink & Wink, 1995). The length of the *Curcuma longa* fibre was 46.8 cm and its standard deviation was about 4.334 and its coefficient of variation, 9.2%. The diameter of the fibre observed in Scanning Electron Microscopy was found to

be within a range of 532.64 and the coefficient of variation was 24%.

Summary and Conclusion

Curcuma fibre is a natural fibre that is derived from the sheath of *Curcuma longa* variety, which belongs to the family *Zingiberaceae*. The study of the fibers extraction conditions seems to have an important role on the fiber properties.

The characterization of *CLPF* provide new hope for natural fibre research to compete with hazardous man-made fibre. Tensile strength and young's modulus are 1060 ± 7090 Mpa and 1.6% of its elongation, which is significantly similar to other natural fibre. SEM investigation revealed that the *CLPF*, presence of roughly cylindrical structure. The cells are roughly circular in nature but do not have uniform dimension and it series as mechanical bonding in a composite matrix. The XRD and FTIR analysis shows that the fibre have semi-crystalline. The high percentage of cellulose in *CLPF* can offer relatively higher strength and low density of *CLPF* is used to develop the light weight composite material. The average density of the fibre is about 0.067 kg/m^3 .

The thermal degradation stability confirms it's withstanding polymerization temperature. Thus this characterization results firmly confirms the possibility of using this fibre for the manufacture of sustainable material. Due to its good strength, cost effective and renewable sources and the fibre can be used to make wider application of textiles.

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SLEEP DEPRIVATION AMONG YOUNG ADULTS DURING PANDEMIC

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Abstract

During the COVID pandemic and lockdown period, reduced physical activity and disrupted routines of people are some of the main factors for changing sleep pattern. Thinking about the COVID-19 crisis and watching news about the crisis, death of people causes stress among people, which is one of the primary causes of insomnia. The young adults aged 20-30 years were selected through snowball sampling technique and self-constructed questionnaire on “Adult Sleep Screening Test” was used to find out the level of sleep deprivation among young adults during pandemic. The results concluded that there is no significant difference found in the variables like age, gender, working status, area of living with respect to sleep deprivation as well as in its dimensions among the selected young adults. But comparatively 20-25 years female young adults who are working and residing in rural area having higher sleep deprivation compared to other counterparts.

Keywords: Sleep deprivation, gender, age, working status, living area

Introduction

Sleep is a physiological process that is very necessary for survival. The quality of sleep is strongly related to psychological and physical health and other measures of well-being (Pilcher, Ott, 1998). Almost one-third of adults reported difficulty in sleep (Mellinger *et al.*, 1985). Different persons’ sleep and wakefulness patterns vary depending on their age, work, physiological and psychosocial factors, psychiatric disease, and some types of physical illness (Tsui & Wing, 2009). Most people are confined to their homes. This confinement is stressful in itself as individuals are sharing the limited space for a prolonged period with few close contacts. In addition, they experience a lack of novel stimuli, disruptions of routine activity, increased parenting responsibilities, especially for women, and altered productivity expectations for those engaged in professional duties from home. In addition to the ever-present fear of contracting COVID-19 as it spreads across the country, uncertainty about jobs, economic situation and the health and safety of loved

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ones. In short, lockdown resulted in home confinement during prevailing anxiety and reduction of positive stimuli (Altena *et al.*, 2020). Stress, in general, but not always, has an inverse relationship with sleep. The effect of stress on sleep quality, timing, and duration is influenced by sleep reactivity (Kalmbach *et al.*, 2018). Persons with high reactivity develop insomnia during stressful situations while those without do not. Thus, home-confinement resulting from lock-down increases the chances of disturbed sleep and insomnia through stress (Borbely, 2016).

According to scientific evidence, Sleep is critical at any age, it revitalises the intellect, repairs the body and strengthens practically every bodily system. The amount of sleep one needs depend on various factors - especially age.

National Sleep Foundation recommended sleep times into nine age groups-

Age Range	Recommended Hours of Sleep	
New-born	0-3 months old	14-17 hours
Infant	4-11 months old	12-15 hours
Toddler	1-2 years old	11-14 hours
Preschool	3-5 years old	10-13 hours
School-age	6-13 years old	9-11 hours
Teen	14-17 years old	8-10 hours
Young Adult	18-25 years old	7-9 hours
Adult	26-64 years old	7-9 hours
Older Adult	65 or more years old	7-8 hours

It is very important for humans to get enough sleep each night in order to function properly. A person need an average eight

hours of sleep (Okano *et al.*, 2019). Sleep deprivation occurs when an adequate amount of sleep is not being maintained (Schlarb *et al.*, 2017). It is a condition that is brought on by a lack of sleep. It can cause weariness, weight gain, social changes, clumsiness and daytime sleepiness in a person. Sleep deprivation also cause health problems by increasing stress and obesity. While the short-term impacts are more noticeable, chronic sleep deprivation can heighten the long-term risk of physical and mental health problems. But the consequences like economically, mentally and emotionally have spread far and wide and pose significant barriers to sleep. Sleep is an important biological process, and it's perhaps more important than ever as we deal with the pandemic's mental, physical, and emotional demands. So, there is a need to assess sleep deprivation level and to determine the influence of socio-demographic factors on sleep deprivation during pandemic. From this information further/future study could be focused on how sleep deprivation effects on cognitive, behavioural, physiological, and emotional measures which affect productivity.

Sleep issues have evolved into a modern epidemic that is wreaking havoc on people's bodies and minds. The epidemic has altered many aspects in people's lives. Everything shuts down; school, colleges, universities, offices, industries. People were quarantined in their homes. And there are many factors that cause stress, anxiety, depression for which people lose their sleep. Millions of people had insomnia before the coronavirus, and the epidemic has sadly added a slew of new issues – even for those who had never

had a sleeping difficulty before. Based on these following objectives were:

- To understand socio-demographic profile of the respondents
- To assess sleep deprivation among young adults based on demographic profile

Methodology

The present study was intended to assess the “Sleep Deprivation among Young Adults during Pandemic”. The sample for the study was collected from Assam through snowball technique. The researcher selected this area as per the convenience during covid lockdown period. A total number of 150 young adults aged from 20-30 years of age were selected for the study. Assurance was given to the respondent that collected data will be kept confidential. Data was collected through Google form without having direct contact with the respondents to ensure social distancing during pandemic. To collect the data self-constructed questionnaire on “Adult Sleep Screening Test” was used to find out the level of sleep deprivation among young adults during pandemic. The tool consists of 40 statements with 7 areas, namely sleep complaint, sleep environment, breathing, situation sleep, behavioural and positional sleep, sleep quantity and sleep quality. The tool was self-constructed by referring available international tools such as Stanford Sleepiness Scale (SSS) (Hoddes *et al*, 1972) designed to quantify subjective sleepiness levels.

Our scale is a simple self-report, pencil-and-paper measure / options selection in google form mode. The questionnaire was sent to three experts to verify its structural and content validity. Consistency was examined using Cronbach α coefficient, which was calculated to be 0.788. The tool was constructed with 5 point Likert scale and the statements were awarded as never=1, sometimes=2, often=3, frequently=4, always=5. Based on the number of statements the tool score ranges between 40-200. Higher the score denotes higher sleep deprivation and the lower score indicates low sleep deprivation.

Results and Discussion

Demographic profile of the respondents such as their age, gender, working status and area of living were collected and depicted below.

Table 1. Socio-demographic Profile of the Selected Respondents

Variables	Category	Frequency	Percentage (%)
Age	20-25	116	77.3
	26-30	34	22.7
	Total	150	100
Gender	Male	48	32
	Female	102	68
	Total	150	100
Working status	Working	53	35.3
	Non-working	97	64.7
	Total	150	100
Area of living	Rural	61	40.7
	Urban	89	59.3

Table 1 depicts that, the general profile comprises of age, gender, working status, and area of living. Among the selected respondents, 77.3% of them were under the age group of 20-25 and 22.7% of them were in the age group of 26-30. In the case of gender, 32.0% of them were male and the remaining 68.0% of them were female. With respect to working status, 35.3% of them were employed, and 64.7% of them were unemployed. With respect to area of living, 40.7% were residential and rural areas, and the remaining 59.3% of them were residing in urban area.

Table 2. Level of sleep deprivation among young adults

Levels of sleep deprivation	Frequency (N)	Percentage (%)
High	31	20.7
Low	119	79.3
Total	150	100

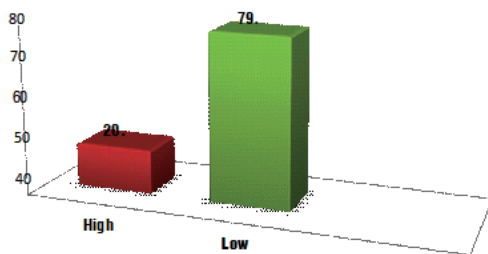


Figure 1. Level of sleep deprivation among young adults

Table 2 and Figure 1 describe sleep deprivation among young adults. From the above table and figure it can be seen that majority of young adults were experiencing low level of sleep deprivation during pandemic (79.3%) and the remaining (20.7%) were experiencing high level of sleep deprivation during pandemic. It can

be concluded that the majority of young adults were experiencing low level of sleep deprivation during pandemic. The sleep deprivation levels among young adults were discussed in the following tables based on age, gender, working status, and area of living.

Table 3 depicts sleep deprivation level among young adults with respect to age. From the table, it was observed that, in case of 20-25 years age group, majorities' are under low sleep deprivation level (i.e.) 81.0% and the remaining 18.9% were experiencing high level of sleep deprivation. In case of 26-30 years of age group, 73.5% were experiencing low sleep deprivation and the rest 26.4% were experiencing high sleep deprivation level during the pandemic. The reason for this may be due to lack of job or lockdown or financial constraints.

In adults, sleep loss refers to sleep that is less than the typical basal need of 7-8 hours per night. Excessive daytime sleepiness is another most common symptom of sleep deprivation, although other signs include depression and poor memory or attention (Dinges *et al.*, 2005). Sleep deprivation is a common ailment that is becoming more common as people become older. According

Table 3. Level of sleep deprivation by Age

Category	Sleep Deprivation Level			
	High		Low	
	N	%	N	%
20-25 (116)	22	18.9	94	81
26-30 (34)	9	26.4	25	73.5
Total (150)	31	20.6	119	79.3

to some studies (Liu *et al.*, 2000; Kapur *et al.*, 2002; Strine and Chapman, 2005) at least 18% of adults say they don't get enough sleep due to several reasons.

Table 4. Mean, Standard deviation and t-test of Sleep deprivation by age

Category	Mean	SD	t-value
20-25 (116)	95.85	20.46	0.623; p=.534 ^{NS}
26-30 (34)	93.26	23.95	

NS-Not significant

Table 4 shows mean, SD and t-values of sleep deprivation among young adults based on age. The observed mean and SD values among 20-25 years age group, young adults were 95.85 and 20.46 respectively. The mean and SD value of sleep deprivation among the age group 26-30 were 93.26 and 23.95 respectively. The observed t-value is 0.623 and p values 0.534 which is not significant. The table clearly depicts that sleep deprivation among young adults was high among the 20-25 years age group, but no significant difference was found.

Table 5. Level of Sleep Deprivation by Gender

Category	Sleep Deprivation Level			
	High		Low	
	N	%	N	%
Male (48)	10	20.8	38	79.1
Female (102)	21	20.5	81	79.4
Total (150)	31	20.6	119	79.3

Table 5 Depicts sleep deprivation level among young adults with respect to gender.

From this table we observed that, in case of gender, majority of male respondents are under low level of sleep deprivation

i.e. 79.1% and 20.8% were experiencing high sleep deprivation. In case of female respondents, 79.4% were experiencing low level of sleep deprivation, and the remaining 20.5% were undergoing high level of sleep deprivation due to pandemic, lockdown and loss of job/financial crisis.

Table 6. Mean Standard deviation and t-test of Sleep Deprivation by gender

Category	Mean	SD	t-test
Male (48)	94.02	21.65	-0.491; p= 0.624 ^{NS}
Female (102)	95.85	21.14	

NS=not significant

Table 6 shows mean, SD, and t-values of sleep deprivation among young adults based on gender.

It is possible that physiological responses to sleep deprivation are not equal among men and women (Corsi-Cabrera *et al.*, 2003). Only few studies have examined the gender differences in cognitive performance during sleep deprivation. Men performed worse in vigilance task than women, although both men and women returned to baseline after recovery sleep (Corsi-Cabrera *et al.*, 2003). According to another study, women out performed men in verbal and visuo-constructive skills after 35 hours of sleep deprivation (Binks *et al.*, 1999). Gender differences were not observed in word fluency, maintenance or suppression of attention, auditory attention or cognitive flexibility. However, only one point of measurement was included and so the difference in performance could be because of sleep deprivation or initial distinctions between the gender groups.

The observed mean and SD values among male respondents are 94.02 and 21.65 respectively. The observed mean and SD values of female respondents are 95.85 and 21.14 respectively. The obtained t-value is - 0.491 and p-value 0.624 which is not significant. According to the findings, no significant variations in sleep deprivation were detected between male and female respondents, but female respondents were more sleep deprived than male respondents.

According to a study by Michele Ferrara *et al.*, (2015) one night of sleep deprivation alters economic behavior in a gender-sensitive way. Females' reaction to sleep deprivation, characterized by reduced risky choices and increased egoism compared to males, may be related to intrinsic psychological gender differences, such as in the way men and women weigh up probabilities in their decision-making and/or to the different neuro-functional substrate of their decision-making.

Table 7. Levels of Sleep Deprivation by Working Status

Category	Sleep Deprivation Level			
	High		Low	
	N	%	N	%
Working (53)	13	24.5	40	75.4
Non-working (97)	18	18.5	79	81.4
Total (150)	31	20.6	119	79.3

Table 7 depicts sleep deprivation level among young adults with respect to working status.

From the table it was observed that, in case of working, majority of the respondents are under low sleep deprivation i.e. 75.4%

and the remaining 24.5% were experiencing high level sleep deprivation during pandemic.

In case of non-working young adults, 81.4% of the respondents were experiencing low sleep deprivation and the remaining 18.5% were experiencing high sleep deprivation during pandemic.

Table 8. Mean Standard deviation and t-test of Sleep Deprivation by working status

Category	Mean	SD	t-test
Working (53)	93.71	22.95	-0.659; p=0.511 ^{NS}
Non-working (97)	96.11	20.33	

According to the National Commission on sleep disorders, lost productivity and occupational accidents cost the United States \$150 billion each year. A review of study of literature showed that, rotating shifts and sleep deprivation lead to mistakes, dips in attention, delayed reactions, accidents in the workplace, crashes on the roadways, reduced productivity and difficulties in communication (National Sleep Foundation, 1999).

Swanson *et al.* (2011), proved that long work hours may contribute to chronic sleep deprivation, which may in turn result in work impairment. Risk for sleep disorders substantially increases the likelihood of negative work outcomes, including occupational accidents, absenteeism and presenteeism.

Table 8 shows mean, SD and t-values of sleep deprivation among young adults based on working status. The observed mean and SD of working respondents are 93.71 and 22.95 respectively. The mean and SD of non-

working respondents are 96.11 and 20.33 respectively.

The calculated t-value is -0.659 and p-value 0.511 which is not significant (Table 8). As a consequence of the findings, it was determined that there was no significant variation in sleep deprivation levels among young people based on their employment situation.

According to (Amir *et al.*, 2004) studies have revealed that people who have worked night shifts in the past are more likely to have endothelium dysfunction than people who have never worked night shifts, implying that sympathetic activation is a direct cause of endothelial dysfunction.

Table 9. Levels of Sleep Deprivation by area of living

Category	Sleep Deprivation Level			
	High		Low	
	N	%	N	%
Rural (61)	14	22.9	47	77.0
Urban (89)	17	19.1	72	80.8
Total (150)	31	20.6	119	79.3

Table 9 exemplifies sleep deprivation level among young adults with respect to area of living.

From the above table it was observed that, majority of young adults resides in rural area were under low sleep deprivation i.e. 77.0% and the remaining 22.9% were experiencing high level sleep deprivation during pandemic.

In case of young adults who resides in urban area were, 80.8% of the respondents were experiencing low level of sleep

deprivation and the rest 19.1% were experiencing high level of sleep deprivation during pandemic due to lack of job/ financial crisis, pandemic and lockdown.

Table 10. Mean Standard deviation and t-test of Sleep Deprivation by area of living

Category	Mean	SD	t-value
Rural (61)	95.50	22.06	.115; p=.909 ^{NS}
Urban (89)	95.10	20.80	

NS=Not Significant

Table 10 shows mean, SD and t-value of sleep deprivation among young adults based on area of living. The observed mean and SD value of respondents from rural areas are 95.50 and 22.06 respectively. The observed mean and SD value of respondents from rural areas are 95.10 and 20.80 respectively.

The observed t value is 0.115 and p-value 0.909 which is not significant. It could be stated that there is no significant difference shown between rural and urban areas, but the result shows that the respondents from rural areas are highly sleep-deprived during pandemic.

Summary and Conclusion

Sleep is one of the main factors for healthy living of human beings. The COVID-19 epidemic has altered many aspects in people's lives. People were quarantined in their homes; shops, schools, colleges were closed, movement outside was prohibited, offices and industries were closed, some had lost their loved ones, some had lost their income sources, some did not even get their one time meal to eat.

More than the virus, people were afraid of the changes that have happened because of the virus. These factors caused increasing in stress and anxiety among people which leads to disruption in regular sleeping pattern. This study mainly focused on the influence of socio-demographic variables on sleep deprivation among young adults during pandemic. From this study, it was observed that there is no significant difference found in the variables like age, gender, working status, area of living with respect to sleep deprivation among the selected young adults from Assam

during the pandemic. But comparatively 20-25 years female young adults who are working and residing in rural area having higher sleep deprivation compared to other counterparts. And in the COVID-19 pandemic, it was more common to people not having sufficient sleep. It was due to the closing of offices, schools, and colleges; everyone had to stay at home for a long time which also causes stress and anxiety among the people.

Ethical clearance number: AUW/IHEC/
HD-20-21/XPD-11

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ROLE OF SOCIAL MEDIA IN BUILDING POLITICAL ENGAGEMENT AMONG THE INDIAN MILLENNIALS

* INDIRA, E.

Abstract

India is one of the eight Millennial Majors and over 60 percent of its population are digital natives who access information, interact with their peers and in fact make decisions governed by the social media. Instantaneous, interactive and fast changing media becomes their windows for life and its norms. With such a potential tool in hand, the task of developing a truly democratic society through active social and political engagement of the millennials becomes more promising. To understand how the Indian millennials use social media to build their political sentiments a quantitative study was carried out among the post graduate students in Coimbatore, India. The findings of the study will be helpful in identifying ways to leverage in creating political enlightenment among the Indian millennials.

Keywords: Millennials, Social media, Political participation, India.

Introduction

“The future promise of any nation can be directly measured by the present prospects of its youth” – John F. Kennedy

Nearly 60% of India’s population comprises of the millennials (the generation

born between 1980 and 2000). India being one of the eight countries known as Millennial Majors, India also holds the demographic dividend of the young adults and leverages them towards a promising and prosperous national development.

Born along with the millennials is the digital technology with its wide spectrum of opportunities which has infiltrated in every aspect of life. The millennials are the digital natives and Internet fuels their passions and interests. They strongly believe that they can create a better future with digital technologies. 61% of the Indian millennials are Internet users and spend an average of 17 hours online weekly.

The way the people communicate, get connected, form opinions and organize for collective behaviour is highly influenced by the social media. Social networking sites like Facebook, Twitter, You tube, Instagram have created a public sphere in which the individuals are active in sharing information and exchanging ideas. To a great extent, social media enhances the level of civic engagement of the public and thereby builds up the social capital of the nation.

On a closer view, social media has transformed the scope of political

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communication too. The previously passive audience has become more active through direct and two-way communication through social media. The information shared on social media goes viral rapidly. Through social media, an ordinary citizen becomes the producer of information and they are able to voice their opinion to a wider, global and niche audience. In addition, interference from government or statutory bodies is relatively latent for social media interactions.

Social media is a personalized medium and especially the millennials exhibit different behavioural and attitudinal patterns of social media usage for political participation and engagement depending on specific situations and their social milieu.

Political participation can be understood as the “political engagement” or “involvement in the democratic process” by the public. Munroe (2002) defined political participation in terms of the degree to which citizens are exercising their right to engage in political activities (e.g., to speak freely, to vote, to influence, to protest, or to get more energetically involved).

The wheel of democracy will revolve effectively only if there is needful political participation from the millennials who are going to form the majority of population. Their attitude towards politics, governance and democracy is the mercury that will measure the nation’s temperature. The democratic involvement of the people will affect social, economic and other spheres too and this establishes the need for the study.

The advancement of technology has made an impact in all aspects of life. The World Wide Web has connected people world over and social networking sites have opened a myriad of avenues for information, entertainment and participation. The millennials who have toddled along with digital revolution are the biggest participants in social media for politics. Review of related studies was done with the keywords of search as social media, politics and millennials. The findings of these studies enabled to have a better understanding on the impact of social networking sites in influencing the political participation among the youth.

Gilman & Stokes (2014) state that majority of the millennials use social networking sites “like” or endorse political matter, record their opinions on issues and also persuade other users to act. Adding to this view, Vatikiotis (2014) says social media penetration has shed a new light in discussions on how the people engage and participate in media. He also points out that the openness and freedom in social media platforms promote political discussions among the public.

The study to understand the intervention of social media in Indian Parliament Elections of 2014 by Meti (2015) found that the use of social media for political activities influences peoples’ political efficacy, political knowledge and political participation as such. In a study by Rahul, 2016, the new media was found to extend the level of political awareness among the youth population. Vasundara and Ravi (2014) in their study on online campaigning

found that online campaigns provided the youth with necessary information on election and candidates and had a positive influence in their voting behaviour. However, in a study on how social media affects politics by Vinay, Kumar and Hosurmath (2014), the findings revealed that social media is still in a nascent stage in creating a propounding effect on political participation among the youth.

The use of social media in India for political communication using twitter accounts of Narendra Modi and Shashi Tharoor was studied by Bali and Jagan (2017) which suggests that twitter handles not only attempts to convey information but also encourage active political participation among the public. Dahlgrena, 2005 divulges that democracy survives in the public sphere due to the way the interactions occur between the government and the public and this strengthens the political participation among the public.

With every revolution in the media environment, the level of integration of media and politics has always been put on a pedestal. The political actors are now able to communicate 'personally' with the 'public'. With this new dimension in political communication, the study on the political processes and the associated elements is not feasible without the required intervention on social media. (Giuliano, 2006).

Blogs, Twitter and other social net working sites share information persistently and at lightning speed. Gurevitch *et al.*, (2009) affirm that through social media it is possible to make or break the reputation of

someone just within seconds and at times wheel off rumours and test the messages.

In a study on social media's role in political communication, Pande (2015) states that the social media has great influence in the voting behaviour of the public and hence the political actors need to take benefit of this digital affordances.

Based on their research findings, Meti *et al.*, (2015) agree that though the social media users may not intentionally involve in political interactions, they may come across political activities which may lead to an increase in political awareness, and lend ways to political participation.

In a study aimed at understanding how Millennials use social media to educate themselves about political issues and political candidates, it is found that political information is not sought by the Millennials intentionally, rather they stumble upon it. Even their offline political knowledge is due to accidental happening. They form their political opinions guided by social interactions happening online. However, they mentioned that the strongest influence comes from their parents. When it comes to forming opinions on political candidates through their Face book pages, the millennials did not base their opinions just by seeing their posts and status. They also looked into the comments posted by the people and how the political candidates responded to the comments.

With due considerations to the observations made in the research studies reviewed, the present study has been designed

to understand the political sentiments of the millennials and give an overview of what social media in future can do to develop the civic engagement as well as democratic citizenry among the millennials.

The research question for the study is if the social media interactions influence the political participation of the millennials.

Based on the research question, the objectives of the study are:

- to understand the attitude of the millennials on social media interactions on political participation and
- to understand the nature of political participation the millennials intend to involve with.

Methodology

A quantitative study was done using an online questionnaire among the post graduate students in Coimbatore. Through convenience sampling method around 150 post graduate students were contacted and 102 of them responded to the survey. Data on demographic variables and their media habits were collected. Their attitude towards political interactions in social media was collected using attitude statements.

Framework for the study

The motivation and user behaviour establish the attitude of the millennials in using social media for political participations and to understand this end the Social Media for Political Participation Model (SMPPM) was used in this study.

For the purpose of the study, the Social Media for Political Participation Model (SMPPM) has been taken as the theoretical framework. The SMPPM provides a preview of what factors influences the political participation as a result of social media interactions. On the first hand, social media use will happen based on the influence of certain intentions that are existing within the user (Pre exposure / Motives). Upon the use of social media, exposure to political content can be intentional or incidental (Exposure). Social media interactions result in accidental or unintentional exposure to political and other civic contents through messages shared by their social network. These contents will later have their own level of information processing (Reception). Based on the processing, the user may get involved in both low and high effort participatory actions (Behavioural Situation).

This study adopts three main criterion used in the SMPPM model to understand the nature of political participation of the millennials. The social media user will have a basic motive for exposure to political information which can be from the basic level of information and social interaction to personal identity and expression. The exposure to political information for a social media user may be intentional or accidental, incidental. When there is a political participation in the social media, it involves effort that can be considered as lower order or higher order. Hence, the responses of the millennials are segregated based on the following variables.

1. Motives for social media exposure - Information, Expression, Personal Identity, Social Interaction
2. Exposure - Incidental or Intentional
3. Behavioural Situation - Higher Effort or Lower Effort

millennials towards these three categories were analyzed to find out the motives for exposure to political content, whether it is incidental or intentional exposure, if the participation is of lower effort or higher effort.

Political empowerment

By political empowerment it means the ways in which social media empowers its users’ political prophecy. From Table 1, it is understood that the millennials feel that the social media interactions of the millennials enables their participation in public welfare activities and encourages their political engagement. It also provides an avenue for understanding politics for people who have not accessed such information. Similar view is expressed by Boulianne (2011) who mentions that the social media accelerates their users’ political interest and arouses inquisitiveness to access other information sources. However they are less inclined about the influence of social media in developing citizenry. Kim *et al.*, (2013) points out that through social media network, citizens are prone to incidental exposure to political information which was also confirmed by the respondents of the study.

Results and Discussion

The study was done among millennials, the post graduate students in Coimbatore and hence the respondents belonged to 22 to 25 years of age with majority of them in the family income scale of Rs. 40,000/- and above. Among the millennials, nearly 88% of them were using internet as sources of information in comparison to other mass media. Among the social media, they were more comfortable in using Face book than twitter or other micro blogging sites. And nearly 85% of them used social media daily with an average of 1 to 3 hours. They were using these social media sites for information and entertainment more than their drive for friendship or interest. They were using online media mostly for raising public awareness on general issues than monitoring political processes. Their political participation included posting status updates than commenting or re circulating political content.

Political Participation through social media

For the purposes of the study, political participation of the millennials was identified as three aspects – political empowerment, political engagement and political interaction. Each of the responses on attitude of the

Table 2 exhibits the nature of political empowerment based on the views of the millennials. The use of social media for accessing political information to understand politics, sharing of information across national boundaries are found with the basic level of motive for information which occurs incidentally and involves lower effort in a

Table 1. Responses on attitude towards Political empowerment

S.No.	Statements on Political empowerment	% of millennials
1.	Social media enables people to develop more effective ways of citizenship.	55.9
2.	Social media enables to participate in activities that are required for public welfare.	70.6
3.	The social media has encouraged citizens' engagement in political life.	67.6
4.	It provides a way to know and understand politics even to people who have not accessed such information.	69.7
5.	Social media offers candidates, citizens and political groups unlimited space to a variety of important political information .	53
6.	Social media enables interaction of political information beyond national boundaries too.	61.7

behavioural situation. However, high level of participatory motives like expression and personal identity happen intentionally and entail higher effort in a behavioural situation

which are found when social media enables people to develop ways of citizenship and allows them to participate in activities for public welfare and political life.

Table 2. Attitude statements explaining nature of political empowerment

S.No.	Statements on Political empowerment	Motives for exposure	Exposure	Behavioural situation
1.	Social media enables people to develop more effective ways of citizenship.	Expression	Intentional	Higher effort
2.	Social media enables to participate in activities that are required for public welfare.	Personal Identity	Intentional	Higher effort
3.	The social media has encouraged citizens' engagement in political life.	Personal Identity	Intentional	Higher effort
4.	It provides a way to know and understand politics even to people who have not accessed such information.	Information	Incidental	Lower effort
5.	Social media offers candidates, citizens, and political groups unlimited space to a variety of important political information.	Information	Incidental	Lower effort
6.	Social media enables interaction of political information beyond national boundaries too.	Information	Incidental	Lower effort

Political engagement

Political engagements indicate how the social media users engage in political communication. It can be seen from Table 3 that millennials view that social media enables political engagement with a moderate intensity as not more than 60% of the

millennials feel that social media provides an avenue for reporting issues, possess the power to shape the Indian politics and influence their voting decisions. Conversely research studies ascertain that social networking sites like twitter has been a mirror for many social happenings as any ordinary citizen is

allowed to interact directly with the officials (McKee, 2011). These sites also have been playing an important role in influencing the voting decision of people as they consider the information in these sites to be reliable

(Narasimhamurthy, 2014). In addition, millennials feel that the basic feature of social media promotes them to be the active producers of information than just being passive audience.

Table 3. Responses on attitude towards Political engagement

S.No.	Statements on Political Engagement	% of millennials
1.	Social media allows citizens to document and report directly issues they see in their communities.	58.8
2.	Online political engagement is largely restricted only to people already active in politics and on the Internet.	28.1
3.	Social media users have the power to shape Indian politics.	54.5
4.	In social media, people become the producers of information and do not require any media for transmission.	62.4
5.	Reputations can be enhanced or destroyed through continuous social media posts.	56.3
6.	Information found on the Internet influences voting decision during the elections.	59.4

The analysis of the attitude statements explaining the nature of political engagement as found in Table 4 reveals that the use of social media for reporting issues in a community, creating posts on politics which requires active interest and involvement in the democracy result in higher level motives for exposure like expression, personal identity and social interactions. In the above mentioned situations, the millennials intentionally look out for political engagement through social media and the consequence of most of such interactions call for a higher effort of participation in a behavioural situation. On the other hand, at times, the reputation of people, political actors may be intentionally affected through the posts which stand as a form of critical assessment and expression. This requires a higher effort in such behavioural situation for the millennials. In case of the information

in the social media influencing the voting decisions of the millennials, there is a pre requisite for social media interactions to happen either incidentally or intentionally. Such interactions happening on a larger scale and longer time requires higher effort which will lead to the impact of voting decisions of the millennials.

Political Interaction

By political interaction, it means the ways in which different stakeholders involve in political communication amongst themselves. The millennials hold a positive attitude with the statements which propose that social media interactions act as a confluence for politicians, voters and parties. Mahajan, (2017) has mentioned that there are few politicians who lend a helping hand to ordinary citizens through social media and Tang and Lee (2013) imply that as

Table 4. Attitude Statements Explaining Nature of Political Engagement

S.No.	Statements on Political Engagement	Motives for exposure	Exposure	Behavioural situation
1.	Social media allows citizens to document and report directly issues they see in their communities.	Expression	Intentional	Higher effort
2.	Online political engagement is largely restricted only to people already active in politics and on the Internet.	Personal Identity	Incidental	Higher effort
3.	Social media users have the power to shape Indian politics.	Social Interaction	Intentional	Higher effort
4.	In social media, people become the producers of information and do not require any media for transmission.	Expression	Intentional	Higher effort
5.	Reputations can be enhanced or destroyed through continuous social media posts.	Expression	Incidental/ Intentional	Lower effort
6.	Information found on the Internet influences voting decision during the elections.	Social Interaction	Incidental/ Intentional	Higher effort

social media enables direct connections to the political actors it upshots more political interest and participation among the public. Similarly, the millennials feel that social media allow for expressing critical views on politics and issues and thereby record their opposition or support which corroborate the results of research studies that observes that, though the millennials appear to be disengaged with politics, they hold more critical attitudes about institutional politics.

On the other hand, the millennials in the present study have expressed less agreement that social media enables political leaders to have personal communication with the public. The millennials have shown only a modest agreement with the view that the personal social media accounts of politicians act as first source of information though in recent times it is witnessed that politicians break the news by posting a message on their own Twitter account.

Table 5. Responses on Attitude towards Political Interaction

S.No.	Statements on Political Interaction	% of millennials
1.	The social media brings politicians and parties closer to their potential voters.	68.9
2.	Through social media, it is possible to know the views and opinions of the political leaders' world over.	44.1
3.	Social media has allowed the public to 'express' and look at their political party leaders more critically.	64.7
4.	Social media accounts of popular political personalities have emerged as the first sources of information for both news and views.	55.9
5.	The political leaders are able to have 'personal' communication with 'public' through social media.	47
6.	Hash tag is a way to express your support or opposition of many political issues.	69.7

The analysis of the statements (Table 6) to explain the nature of political interaction divulge that the social media use allows for confluence of political parties, politicians and the voters and result in a intentional, higher effort social interaction. Conversely the possibility to know the views and opinions of the political leaders world over and first

hand information through social media accounts of politicians reflect a basic motive of information that happens incidentally and relate to lower efforts in a behavioural situation. Critical views of political issues and expression through hash tags envelop the motives of expression and personal identity done intentionally requiring higher effort.

Table 6. Attitude Statements Explaining Nature of Political Interaction

S.No.	Statements on Political Engagement	Motives for exposure	Exposure	Behavioural situation
1.	The social media brings politicians and parties closer to their potential voters.	Social Interaction	Intentional	Higher effort
2.	Through social media, it is possible to know the views and opinions of the political leaders' world over.	Information	Incidental	Lower effort
3.	Social media has allowed the public to 'express', and look at their political party leaders more critically.	Expression	Intentional	Higher effort
4.	Social media accounts of popular political personalities have emerged as the first sources of information for both news and views.	Information	Incidental/ Intentional	Lower effort
5.	The political leaders are able to have 'personal' communication with 'public' through social media.	Social Interaction	Intentional	Higher effort
6.	Hash tag is a way to express your support or opposition of many political issues.	Personal identity	Intentional	Higher effort

The results of the study reveal that the millennials do consider social networking sites to be a vital ingredient of their political participation. They do consider that their involvement in social media, especially Face book has harnessed them with political empowerment, engagement and interaction. This will evolve them to be enlightened citizens and play their part in the democratic process.

Summary and Conclusion

Millennials, in the age group of 18-35 are the most potential voters of the upcoming

elections all over the world and in India. The communication network of the netizens is the social media from which they explore the social, economic and political information. They look at the world through the lens of social media. They consider their continuous exposure to the posts; blogs, status updates and opinions shared through social networking sites a form of political activity. There are two streams of thoughts which consider that these exposures do not qualify them to be politically educated and their voting decisions being decided by the interpersonal relations. The other stream of thought confirms that

social media has the capacity to enhance or destroy the reputation of political actors, float rumours, enable a platform for debates and discussions and hence this experience will make the millennials decide on their representatives.

The mainstream news media is getting supplanted by the micro blogging sites which are exceedingly used by the millennials. The future trends in political communication will be decided by the level of convergence of the traditional media and the new media. The mass media is popularly designated as the fourth pillar of democracy. The eventuality of the social media is so powerful that the social media is projected to be the fifth pillar of democracy. A recent study conducted by IRIS Knowledge Foundation and the Internet and Mobile Association of India, asserts that nearly one-fourth of the parliamentary constituencies in the next general election will be governed by Face book users who will be the most up-to-date vote bank that will wield the power in deciding the Indian political arena.

Social media is capable of stimulating democratic ideals in the society. The millennials are networked citizens, enabled by the social media and they can wield their information power to hold other estates accountable. For those people who are concerned about what is happening around them and actively participate in those issues, the internet is a good stage to bring together

the various stakeholders of political process and eventually develop this for a healthy democratic participation.

According to Media Analyst N K Singh, “the role of social media is more dominant in creating opinions and mobilizing the masses. In this digital era, internet plays a major role in connecting and communicating the people. For the millennials and other people, internet and social media establish a public sphere where they are allowed to freely share and exchange ideas with great speed. Hence social media will have a vital role in the upcoming elections, even though it may not ring the final bell”.

Based on the opinions of the millennials, we come to understand that even though the millennials do not intentionally seek or follow political content, they have shown their acknowledgement of the power of social media in creating political empowerment, engagement and interaction. It becomes clear that with more planned and focused effort through social media, political enlightenment can be created among the millennials. As a preliminary task, efforts should be made to unveil the acumen existing in the millennials and also to recognize the potential their social media participation can wield in instituting a strong political participation. The millennials should also be educated on the need for a powerful political participation which becomes the lifeline of a true democracy.

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RESEARCH ABSTRACT

BAKERY PRODUCTS CONSUMPTION AMONG ADOLESCENTS AND ITS HEALTH IMPACTS

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Bakery product consumption is most common among adolescents in the present scenario. People prefer these products because they are convenient, tasty and save time in their hectic schedules. Because of their flavor, taste and appearance, the majority of the adolescents preferred bakery items. Traditional healthy food practices have been lost as a result of bakery product consumption and diet globalization. The devaluation of cooking skills has resulted in the availability of cheap food outside the home. Bakery products are quick, convenient, and reasonably priced for the amount of food obtained and they appeal to people of all ages. As a result, the purpose of this study was to highlight the bakery product consumption pattern among today's adolescents and its health implications.

The adolescent stage is the most crucial in human development. Eating habits are formed during adolescence. Food cravings will increase during this time, and people will be looking for new types of foods; at the same time, bakery products will play an important role in meeting their needs. As a result, for a better scope, natural ingredients as flavour enhancers, colouring agents and

texture enhancement aids are used in bakery products.

Bakery industry is the rapidly growing industry in our country. The United States indicated that the bakery product had the largest market with retail sales amounting to approximately 86.17 billion US dollars, in the year 2016. This industry in India is the largest of the food industries with an annual turnover of about Rs. 3,000 crores. Bakery industry has played a significant role in the economic development of the country. The two most important bakery products viz., bread and biscuits accounts about 81 percent of the whole bakery products. The yearly manufacturing of bakery products which includes bread, biscuits, pastries, cakes and buns are from both the organized and unorganized sectors, which comprises 15 lakh tonnes most of which are in the organized sector is estimated to be around 31 lakh tonnes. The production of bakery products in both is estimated to be around 15 lakh tones and 11 lakh tones.

India is the second largest producer of biscuits (67 percent) in the world. The bakery industry in India has changed through

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the decades. The Indian bakery market is estimated at a CAGR of 7.5 percent. The bakery industry is one of the largest sub sectors within the food industries. During the early 1990's, only the elite sections were inclined towards bakery and bakery products. But with growing disposable incomes and changing lifestyle trends, bakery is becoming very popular among the middle class Indians as well. Breads and biscuits form more than 82 percent of the Indian bakery market and other items like puffs and pastries accounts for around 18 percent of the total market. The cakes and pastries segment of the industry is worth ₹ 1,250 crores of which 65 percent is accounted for by the unorganized sector.

The Indian bakery industry is one of the biggest sections in the country's processed food industry. Bakery products, which include bread and biscuits, form the major baked foods accounting for over 82 per cent of the total bakery products produced in the country. It enjoys a comparative advantage in manufacturing, with an abundant supply of primary ingredients required by the industry, and is the third-largest biscuit manufacturing country (after the United States and China).

Due to the rapid population rise, the rising foreign influence, the emergence of a female working population and the fluctuating eating habits of people, they have gained popularity among people, contributing significantly to the growth trajectory of the bakery industry. Bakery holds an important place in food processing industry and is a traditional activity. With regard to bakery products, consumers are demanding newer

options and the industry has been experiencing fortification of bakery products in order to satiate the burgeoning appetite of the health-conscious Indian. A number of healthy products have been launched in the bakery segment and are gaining popularity at a high rate. The mounting presence of bakery chains has further triggered the growth in the sector.

Due to the fact that those products are always ready to eat. People prefer these products because they are convenient, tasty, and save time in their hectic schedules. The majority of adolescents are drawn to bakeries by their flavour, taste and appearance. Bakery items are sold in school and college canteens. As a result, they have the opportunity to eat bakery products on a daily basis.

A study by Fernández, (2006) among the Spanish school children revealed that, young people were abandoning the "Mediterranean Diet" in favor of industrial products, full of calories and saturated fatty acids but low in nutritional components, which was contributing to obesity and rising cholesterol levels. It was also observed that the children were omitting breakfast.

The saturated fat composition and the fibre free refined flour usage in bakery products makes it unhealthier. Too much consumption of these refined and fatty foods leads to disorders such as obesity, cardiovascular disease and other associated disorders which worsens the health of the adolescents.

In recent years, there has been a lot of interest in baking in Tamil Nadu. A lot of bakery shops are springing up, especially

in Coimbatore. Bakeries can be found in every nook and cranny. They are mostly in close proximity to schools and colleges. The majority of bakery products are made with unhealthy refined white flour. Preservatives, additives, sugar and artificial sweeteners are also present. There are, however, ways to make them healthier and more delicious. Health-based bakery products are those that, when consumed in sufficient quantities, provide special health benefits in addition to normal nutritional supply.

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NEWS MAKER

SEAWEED AS AN ALTERNATIVE TO CONVENTIONAL PLASTIC

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Dr Muthiyal Prabakaran Sudhakar and the team from the National Institute of Ocean Technology (NIOT), Government of India have developed an easily disposable bioplastic polymer from a macro red algae *Kappaphycus alvarezii* (whole seaweed) cultivated in the Gulf of Mannar region. Seaweed in combination with plasticizer PEG -3000 could produce bio-plastic of high tensile strength making disposal easier. This could be a game-changer to replace the conventional plastics

The developed bio-plastic is non-toxic and eco-friendly to the environment without compromising the physical and mechanical properties of conventional plastics. Conventional plastics are a huge threat to the environment as it takes thousands of years to degrade and also they are bio toxic to flora and fauna ecosystems. This is developed as an equivalent alternative to the already existing bio-plastic forms obtained from edible plants such as sugar cane and corn starch. The search for bio-plastic in marine biomass was initiated because it avoids the utilization of valuable food-based edible plants for the synthesis of domestic packages. The scope for renewal is also better and easier with marine biomass

utilization rather than land-based plants. The cost of production is also less compared to the other alternative bio-plastics.

The recent reports of microplastic accumulation in the blood through the day to day usage of use and throw plastics used for food carrying bags also alarm the scientist to look for the cheaper economical source and at the same time sustainable alternatives. The Red algae *Kappaphycus alvarezii* is an established commercial source of carrageenans and other products that have a wide range of industrial applications. Colloidal algal forms are cheap and easy to grow within a short cultivation time (45 days) only with sunlight and without the need for fresh water or chemicals. They are also potential sources of polymers, similar to the terrestrial plant-based polymers that are used to manufacture food packaging and carry bags, which facilitate good oxygen and moisture permeability.

These seaweed-based bio-plastics could be an effective live saviour and their property of well-defined oxygen and moisture permeability properties enable their usage in a food package and their disposal is also easy through the mechanism of food waste collection. PEG-3000 used in the preparation

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of seaweed plastic enhances its tensile strength to make it an effective conventional plastic replacer. Moreover, PEG is already used in many pharmaceuticals and foods as it is non-toxic to humans. Thus, seaweed-based

bio-plastic is a viable option in a densely populated country such as India. It could cull out the use of conventional plastic usage in food bags that are non-degradable and heavily toxic to humans.

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SHORT COMMUNICATION

ARTIFICIAL INTELLIGENCE TRANSFORMING THE CUSTOMERS SERVICE

* SASIREKHA, P.

Abstract

The latest waves of fast development are catching the world's creative mind for how Artificial Intelligence (AI) can change the manner in which we work and live. Certainly, numerous customers are eager to embrace the advantages of AI and see a promising future ahead. However, some have well-established feelings of dread about AI, and most still favour the commonality of the human touch over a faceless machine when given the choice. In spite of these clear inconsistencies, the information likewise uncovers a significant open door. The entryway is totally open for groundbreaking organizations to exploit this time of vulnerability and change their way to deal with a line-up with their clients' AI inclinations. In excess of 70 per cent of all respondents unhesitatingly said that they grasp AI - one of the most complicated and quickly changing innovations on the planet. These are some inputs, on how it is changing the consumer experience in various fields.

Introduction

Artificial intelligence (AI) has been grabbing everyone's attention in recent years. Its constructive nature has given it massive opportunities with numerous applications

(Cummins, 2021). AI plays a significant role in the business world. AI programs hugely support the operations from top to bottom line functions of the organisation. Of the many possibilities that AI guarantees, the customer experience seems to have completely changed. We are already witnessing the progress that AI is making in the fields of banking, automobile, textile, food processing, medical and engineering. Chabot, Google Digital Assistants and Amazon 'Alexa' are already routed the lifestyles of the people. The boundless ability of AI is that AI can analyse and process large amounts of data from a variety of sources, including human behaviours and emotions, thereby enabling the creation of new explicit customer services.

Decision making becomes easier with the dominance of big data, AI and machine learning. It is already being realized that decisions cannot be made with utmost courage and perceptions. Instead, the results should be supported by numerous data. Therefore, AI helps businesses to make rational decisions. It's no surprise that AI is leading the way in almost every industry it is adopted. The latest statistics show that current AI technology can boost business productivity by up to 40% (Jade, 2022).

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AI in Banking

AI has changed the outlook of the banking sector with advanced data analytics. AI enables the banking sector to offer wider customer services in its footsteps. It not only focuses on the automation of services but also facilitates reducing cyber security risks in the financial portal. AI will enable banks to optimize human and machine interactions which leverage operational cost and enables customized services. AI helps banks to predict future outcomes and trends. It helps banks detect fraud and provide a new customer experience (Dumasia, 2021). The banking sector has already taken steps with due diligence to reap the benefits of AI (Khurshid, 2022).

AI in Marketing

AI in marketing leverages the intelligence of technologies to gather data, and customer perceptions, predict customers' actions and take automated decisions that impact marketing efforts (Jade, 2022). AI in marketing benefits the marketing through visual searching. According to Social Media Today, 90% of all data our brains obtain is visual, so systems analysts are comprehensibly absorbed to see if machines can similarly analyze images for shapes, lines, patterns, and colours. 'Pinterest' and Google are notable pioneers in this space; (Shayman, 2019). As long as AI follows its results, it can make life easier for marketers, and as long as consumers retain the right to data privacy, it will make business easier.

AI in Healthcare Sector

AI is as of now showing up an a unique advantage in the medical care area. Through the use of AI in medical and health care, specialists and surgeons gain access to real-time information and insights into a patient's current health status. This AI-supported information enables healthcare providers to make immediate, intelligent decisions before, during and after procedures to ensure optimal outcomes (Srivastava, 2018). IBM's mental supercomputer had the option to rapidly analyze the presence of an uncommon sort of leukemia in a patient that even specialists couldn't follow for quite a while of study (Battina, 2021). There are calculations and frameworks that support recognition and therapy of ongoing diseases and with electronic wellbeing records set up, man-made consciousness and AI frameworks are just making customized medical care a reality today. Likewise, prescient medical care is gradually picking up speed too (Kokila & Ushadevi, 2017).

AI in Manufacturing Industries

There are a lot of benefits when it comes to artificial intelligence and manufacturing. It allows for more product innovations, increased safety precautions, faster decision-making processes and quality improvement (Filippone, 2021). According to a BCG report, the most important AI applications in the manufacturing industry are intelligent, self-improving machines that enable automation in production processes (Mewari & Kamath, 2021). 'Cobots', also known as joint robots, are designed to work safely with

humans. They are small and comparatively lightweight, providing a very affordable opportunity for manufacturing companies concerned in engaging robotics (Filippone, 2021).

AI in Tourism sector

With the development of AI, smart tourism is changing gradually (Wang *et al.*, 2020). Many new technologies have emerged in the field of artificial intelligence for tourism sector. These technologies were instrumental in providing an innovative experience to the tourist. These are techniques include facial recognition technologies, virtual reality applications, chatbots, Robots, Artificial Intelligence on Google Maps, Translators, Audio Tours, Easy Shopping, etc. these technologies make the tourism industry more viable (Samala *et al.*, 2020). AI plays an important role in development and deployment Smart tourism, since data is transformed into experiences and value proposals will be upgraded by AI (Bulchand Gidumal, 2020).

Conclusion

AI technologies such as virtual assistants and intelligent automation make the routine process easier for individuals and improve the consumer experience in many ways. It frees up time and energy for people to commit themselves to artistic and social pursuits (Horowitz, 2020). In times driven by technology, it is good to increase the AI track in various industry identities. This is because it indicates that the industry can make the best use of the latest technology for improving performance and productivity. At the same time, industries can have better control over processes. Business Processes are highly automated, and business operations and protocols are regulated with this new technology. Hence, consumers will have an improved level of satisfaction, due to the growth of Artificial Intelligence. It is understood that in the future AI will dominate the consumer market through its versatile nature.

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BOOK REVIEW

REVENUE MANAGEMENT FOR THE HOSPITALITY INDUSTRY

Author : Shweta Singh
Year of Publication : 2019, Pp 294
Publishers : Random Publications,
New Delhi - 110002
ISBN : 978-93-529-358-0

Revenue Management for Hospitality Industry is filled with practical examples and best practices which is a critical aspect of the industry. Though numerous revenue management examples from the hospitality industry and running case examples throughout the book, students will discover how they can incorporate revenue management principles and best practices for sustainability. As the author explains, the core of revenue management in hospitality industry is to, “charge the right price, to the right customer, for the right product, throughout the right channel, at the right time”. The book is intended for students with prior knowledge and understanding of the hospitality industry, and will explain what they need to know and how to be successful.

Hospitality industry is a broad category in service industry that includes lodging, event planning, theme parks, transportation, cruise line and additional fields within the scope of tourism industry. Hospitality books

always inspire readers as it helps to gain new perspectives and learn from the astuteness and success of others in the industry. Various tactics and strategies allow different business to get the most out of their potential way to maximize their revenue. To be successful in Hospitality Industry, revenue management strategies need to take into account industry trends, time of the year, competition, local demand, weather, price sensitivity as priority when compared with other factors. All of these strategies are going to have an impact on the point of equilibrium between supply and demand. Though there are many books in revenue management for the Hospitality Industry. This particular book by Shweta Singh is one of its kind and is intended for readers with some prior knowledge and understanding of the hospitality industry and will explain what they need to know and how to be successful in the industry.

This book emphasis on various aspects of hotel revenue management and accounting system with insights into asset inflows (revenue) compare with its asset outflows (expenses). Various corporate governance models like Anglo-American model, Non Anglo-American Model were compared from a think-tank perspective. Inflation and Pricing, Currency Devaluation and Competitiveness are explained with simple calculations. Forecasting in Hospitality and

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Tourism Industry is assessed by means of TPF model highlighting on factor accumulation, including capital accumulation through investment, labour growth through population growth and challenges to the skill of laborer through educational training; technological change, through technological progress and policy changes.

The book also shed light on Hotel Industry Management of 21st century practices, the building costs in the hotel sector have gradually become more attractive to private investors with assurance of financial incentives from government. Categories of Hotel partnership, co-owner chain, chain type hotels, multinational hotels, sole proprietorship, heritage hotels, time sharing resorts and franchise services.

The book also covers the aspects of environmentally responsible hotels and its adaptation of green practices. In a technology anticipated perspective of a hotel, casino or restaurant, these important advances have the potential to create more efficient and profitable businesses and make your business more appealing to guests. The corporate pricing guidelines follow two main criteria; to maximize revenue and to protect key partnerships. Pricing is formulated and executed on strategy, tactics and execution and measurement.

Innovation Management strategies such as “boutique” Hotel, guests tend to perceive as a stylish location for which they are willing to pay premium room rates for Binkley, mid-priced hotel market (Chittium). Innovative technology adoption process were narrated

with suitable examples. Importance of practicing recent trend strategy like extending their product lines to meet the specific needs of smaller segments of travellers and diners rather than mass marketing. Customer knowledge management is very persuasive by means of providing information to improve relationships with those important customers is clearly explained with suitable real-time case studies. The book also insisted on customer-focused management requires a customer-based analysis of the information necessary for designing processes and making decisions regarding value creation in the firm.

Elements of distribution channel management in these chains will have their own specific needs, which the producer must take into account along with those of the all-important end-user. Fundamental components of CRM such as Operational, Analytical and Collaborative provides holistic view of customers sales and services information. Management Information System undertaken by firms take account of day to day operations and aberrations were addressed in crisply. The ways which the marketing approach differs from the classic or sales approach to managing business. Determinants of various pricing strategies were clearly explained with suitable examples.

The book also covers the major elements in management of tourism and hospitality industry such as accommodation, concepts of eco tourism accommodation, development strategies, applications of SAR in small hospitality firms in the foreseeable future.

Overall this book by Shweta Singh provides the readers an insight into the various aspects of Revenue Management for Hospitality Industry and structured in such a way contributing to the holistic purpose that

serve the academic practitioners. This book can be used to enhance their knowledge in hospitality management relating to financial decision making.

Sathyabamavathy, K.

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