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"OORJA" is an incredibly potent term, Meaning 'energy' in Sanskrit, "OORJA" is also the name of a Vedic deity, who in many ancient and modern scriptures has been compared with Uzza (Shakti as Venus) in Arabic and Divine Energy in English. "OORJA", our Journal, signifies a confluence of diverse cultures and assorted intelligence to stir up the cerebral powers of its readers.

The International Journal of Management and IT an annual publication is a **double blind peer reviewed refereed** publication of the International School of Informatics & Management Technical Campus, Jaipur. It is dedicated to the dissemination of the concepts and ideas of modern day Management and IT thereby stimulating academic fervor and search for knowledge amongst practicing managers and encouraging applied and theme – based field research in the area of Management and IT across the globe. The journal seeks to embody the spirit of enquiry and innovation to augment the richness of existing Management and IT literature and theories. It is our humble effort to provide a meeting ground, a common platform and an open house for researchers, practitioners and academicians to share their vast repository of knowledge and information across the world.

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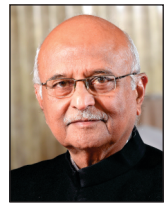

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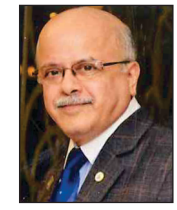

Dr. Vinay Kumar Pai Raikar
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FROM THE DIRECTOR

According to TRAI, March 2021 ended with an active internet user base of 825.30 million from a 795.18 million in December 2020, with the country registering a quarterly growth rate of 3.79 per cent average number of internet users. While the workforce was settling down for a 'Work from home' mode and the 'Vocal for local' business witnessing a great appreciation, the thought 2020 set in was work from home is here to stay and that a contingency plan is must on everyone's cards be it an individual or a business.

But there still remains a doubt as to whether this wave of digitalization is an all-encompassing one? Or could it be only for a selected few? And what if this wave is not inclusive enough to uplift everyone? How do we sustain this pace of evolving technology?

The Pandemic engulfed everybody into the digital wave with not only professionals across industries but genders and age-group being equally pulled into the tech-wave. Be it consumption of video contents across OTT platforms, payments, banking or the consistent engagement over social media portals, digital inclusion became the new rule of the game. While this digital wave is a self-sustained medium of user generated content which provides accessibility, availability, operational feasibility and caters to a spectrum of diverse users with many of the digital solutions catering to masses, the question still remains, as to whether organizations have been successful in securing a future that is digitally inclusive for their users? Are most of the digital solutions being designed for mass–use? Or do they come with a targeted market and a USP that predominantly attracts the urban millennial?

A report by Capgemini on ' The great digital divide' claims that complexity of using internet restrains almost 36% of the people from making the most of technology, while some others struggle with mere technicalities and still others find difficulty in upgrading. With the digital penetration expanding across markets an intervention that looks at people-centric public policies that protect the privacy of its users is critical.

With exaggerated stories doing rounds on Whatsapp and everyday TV ads by banks issuing warnings about not sharing OTP or personal data, there may be some who take a complete aversion to digital banking thereby creating a fear of unknown to embrace the digital wave. It becomes essential here to invest in teaching people through informative campaigns as well interactive channel presence to address their apprehensions and queries, helping them through the transition into the digital world. A natural user experience that replicates common humanized behaviour during digital interactions can increase better adoption.

Empowering the digitally excluded to access more online options through simplification of technology can drive digital transformation with more users falling in from across different sectors. Using symbols or voice control with voice recognition mechanisms or perhaps facial recognition with customizable access can reduce the dependency on typing. The digital divide that has been created by internet with digital natives on one spectrum and the digital immigrants on the other shall cease to exist only when the tech- first digital initiatives are truly inclusive while maximizing the use of digital.

Dr. Ashok Gupta
Director

EDITOR'S NOTE

Innovative thinking coupled with technology is once again going to be the prospective decider, when it comes to the question of, when and who is going to return to work from offices. The reality solutions that include virtual reality (VI) and augmented reality (AI) are likely to eradicate all barriers between people that are inherent to digital collaborative working in times to come.

During anticipating and planning for a work model the main factors considered include the kind of tasks, the level of tacit knowledge transfer required as well the need to embed people in the corporate culture. Say for e.g. Police officers shall still be required to go out and tackle the crime and the factory workers won't be able to perform their jobs from home and where people are required to learn from observing and being physically present, they will have be working from their offices.

The thought that we are going to return to a normal or even a "new normal" doesn't look very attractive as the pace of technological innovations experienced even before the pandemic had made it hard to establish a "normal", which was probably a lasting shift. The fact remaining that the normal is on a permanent shift and is constantly changing, so for once if it weren't the pandemic or any other disaster throughout the year, the reason would definitely have been another, for instance a new technology, emerging competitors or even new ideas.

Creating positive change and competency in totality across organizations - and not just the parts which currently are under threat from disruptive events, while adapting lessons learnt from the past is crucial in building forward-looking and resilient businesses.

The current issue in its unique flavor and style brings to its readers studies on topics as broad as Facial Emotion Recognition using Deep Learning, Selective Hiring, Impact of Inflation on Middle Class Families in Chandigarh City, Impact Of Covid-19 on Indian Sectoral Indices, Work Life Balance and case studies on 'Hamdard Laboratories' and 'Kitkat India's Travel Break Pack Campaign'.

The Book reviews on 'Artificial Intelligence and the Future of Power-5 Battlegrounds' and 'Defining Management: Business Schools, Consultants, Media' are indeed excellent and crunchy tasters of the respective books.

2021 has been quite a trip. We thank all our readers, authors, reviewers and editors for their continued engagement with the Journal during these challenging periods.

As I sign off we look forward to more contributions in the form of research papers, review articles, case studies and book reviews for the coming issue.

Happy Reading!

Dr. Manju Nair
Editor-in-Chief

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HAMDARD LABORATORIES: LAUNCH OF ROOH AFZA FUSION INTO THE READY-TO-DRINK SEGMENT

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"Our teams have done a tremendous job in finding an expression of the flavour with tropical Indian fruits. It is a truly magical combination, made with Hamdard's reputed quality standards and crafted with passion."

Hammad Ahmed, Chief Mutawalli, Hamdard Laboratories India

Abstract:

Hamdard, a 100 years old brand of India, has decided to enter into ready-to-drink fruit juice by creating a brand extension of Rooh Afaza, with the name Rooh Afaza Fusion, in June 2020 Indian market. The company test-marketed the product in 2016 and launched the product in five flavours after understanding the consumers' preferences. The company is trying to influence the consumers with its brand name. Still, the competitors like Dabur with Real Juices, PepsiCo with Tropicana, and Coca-Cola with Minute Maid are posing a strong threat before Hamdard. The Case Study presents a picture of the unique proposition offered by Hamdard for the product-Rooh Afaza Fusion and an analysis of the factors shaping the industry's new rules. The consumers in India for this product category are also very demanding and diverse in their choices and preferences. Therefore, the company needs to address the issues for the newly launched product.

Keywords: Brand Extension, Ready-to-drink, Brand, Consumers.

About Hamdard

Hakeem Hafiz Abdul Majeed, an unworldly man who was determined, resolute, created Hamdard Dawakhana in undivided India's capital, Delhi, in 1906. Since its humble origins as a little Unani clinic in one of historic old Delhi's back lanes, Hamdard has been associated with honesty and good quality in the arena of extremely inexpensive Unani medications. Hakeem Abdul Majeed died early, but his better half, Rabia Begum, built the business and managed to live overall odds with the backing of her son, Hakeem Abdul Hameed. Hakeem Abdul Hameed grew up and assumed full responsibility. He helped his mother with his younger brother's upbringing and education. He also enlisted the help of his younger brother in running the company. Hakeem Abdul Hameed and Hakim Mohammed Said, both brothers, rose above all things by helping others.

Hamdard was transformed from an Unani pharmaceutical company to a welfare organisation and then into a trust committed to the health of the nation. With renowned items like Sharbat Rooh Afza, Safi, Roghan Badam Shirin, and more, this Made-in-India brand based in New Delhi has become a household name across India. Abdul Majeed, the current chairman of Hamdard Laboratories (Medicine Division), and his father Abdul Mueed set out to modernise the century-old family business in 2006, a century after it was founded. Abdul Mueed's objective was to preserve Hamdard's Unani system of medicine and keep the relevance of family business in a new period of modernity marked the Internet's arrival, allopathy's development, and the expansion of manufacturing capabilities in

healthcare and pharmaceuticals. The company offers a range of 450 products across its different verticals and has a presence in pan India. The company operates-under 'Classical Medicines,' 'OTC Products,' 'Patented Medicines, ' and 'Wellness Centres.' (Businesses - About, n.d.) **(Exhibit 1)**

Launch of Juices under its Brand-Rooh Afza

In June 2020, Hamdard Laboratories India, having a inheritance of over 100 years, announced its entry into the ready-to-drink segment with the launch of natural product juice tastes and milkshakes under its well-known Rooh Afza umbrella brand. In addition, the brand has created an extension of its existing brand Rooh Afza into two innovative extensions— Rooh Afza fusion and Rooh Afza Milkshake.

The company has launched Rooh Afza Combination, a drinkable blend of real natural product juices in five flavours: pineapple, litchi, orange, lemon, and mango, in a convenient Tetra pack container for the Indian market. Rooh Afza fusion juices are prepared with the intent of promising wellbeing and refreshment with an exciting flavour. (Hamdard Laboratories India Forays into 'Ready-to-Drink' Segment with RoohAfza Fusion and RoohAfza Milkshake, 2020) **(Exhibit 2).**

The company has banked upon its 100 years old iconic brand name intentionally to foray into the Ready-to-Drink juice market to increase the Rooh Afza offering and develop bridges with younger consumers for whom the priority is convenience. The offering is designed to leverage legendary brand-Rooh Afza blended with quality natural juices that have unparallel potential to match the taste of Indian consumers. While launching these flavors, the company applied the principle of test marketing to understand the market's response. They initially launched their product to Delhi and Uttar Pradesh in September 2016 and worked upon the consumer's feedback collected from the cities to improve the product. Finally, in June 2020, the company launched its product across the nation.(Hamdard Enters Ready-to-Drink Segment with Rooh Afza Fusion, 2016)

Due to its wide acceptance in Indian Market, Rooh Afza fusion has also been reasonably priced, and the company has decided to maintain low margins in this competitive market. For a pack of 180 ml, the company is charging Rs. 20. Pricing can be considered pocket-friendly for Indian consumers and enables the company to create its space in the market with a reckoning brand name.

For distribution of the product, the company has decided to take the help of the existing network to reach pan India. The company has agreed to collaborate with major e-commerce players and even with the Paan shops(Small Kiosks) to make the product widely available. It also sells the product directly to the customer through its website to capture a significant market.

Hamdard has designed a special digital ad campaign for the Rooh Afza Fusion and Rooh Afza Milkshake that were launched together aimed more to influence youngsters of the country. The digital campaign was launched with the message 'Freshness and Taste Ka Double Dose' to commemorate the 'double dose' of these pairings. (All New RoohAfza Fusion - Freshness Ka #DoubleDose - YouTube, 2020) **(Exhibit 3)**

Ready to Drink Market in India

In India, the beverage market is apportioned into non-alcoholic and alcoholic beverages. The non-alcoholic beverage market is further divided into carbonated and non-carbonated beverages in India. The primary groups that are monitored are juices, bottled water, energy drinks, ready-to-drink tea

and coffee, flavoured milk, malted beverages, and other non-carbonated non-alcoholic beverages.

According to "India Juice Market Outlook, 2021," the Indian juice market has grown at a CAGR of over 18% during the past six years. The primary segmentation in the juice market is based on the amount of fruit in each section. The numerous parts offered are nectar drinks, fruit juices, and fruit drinks. Fruit drinks, amongst all dominate the market and more than half of all sales are made in this category. However, health-conscious people are also switching from fruit drinks to fruit juice because it is healthier and does not contain extra preservatives or fake flavours like fruit drinks do.(India Juice Market Outlook, 2021 - Research and Markets, n.d.)

Fruit juices rule the market, occupying more than half of all deals. India's customers are cost-sensitive but are looking for alternatives that offer enormous perceived benefits drawn by the price paid. In addition, health-conscious individuals are shifting to fruit juice since it is more advantageous and does not contain additional additives or added flavours. Companies such as Dabur, Parle Agro, Paper Boat, PepsiCo, Coca-Cola, and others have illustrated their nearness within the Indian showcase. By creating everyday items in each assortment, most players illustrate their nearness in each portion. (Beverages Category to Grow 20-25% This Year: Rising Demand for Better-for-You, Functional & Nutritional Drinks - Indiaretailing.Com, n.d.)

Evolving Indian Consumer

The packaged beverage sector in India has various growth drivers. People's lifestyle is changing; they are now cash-rich but time-poor due to improved affordability. Citizens are looking for healthier choices that can provide sufficient nourishment while satisfying their appetites. In addition, people want hygienic products with adequate safety measures taken by businesses to ensure vitality in packaging.

The packed category of juices has a high level of acceptance among the general public. People are no longer interested in buying sweetened juices and have turned their focus entirely to packaged drinks. Indian consumers buy in quantity for their domestic consumption, and packaged juices are frequently purchased. Rather than being driven by necessity, purchases are made regularly and impulsive. As a result, the market's potential is enormous.

It's fair to say that India's packaged juices sector is still developing. However, because many local, national, and international brands are on the edge of success and expansion, new entrants can profit from this opportunity by positioning and promoting packaged and bottled fruit juices as part of the consumer's daily diet. Simultaneously, it is vital to assure consumer affordability while maintaining hygienic characteristics and product quality throughout the year.

Competitive Landscape

According to the research conducted by Goldstein's research, the major players in the market include big brand names. The market is dominated by Dabur India, followed by PepsiCo, Coca-Cola India, ITC Limited, Surya Food, and Agro Ltd. The competition is tough and severe among the rivals.

The players have devised a robust competitive strategy to outperform their rivals. Real Juices from Dabur has been able to position itself as the household brand of India since 1997. Tropicana Juice range has created its impact by using only natural fruits without sugar and preservatives since 2004. Minute Maid from Coca-Cola, launched in 2011, has offered an array of products to the Indian

consumer. Other players have also positioned them in the market, challenging new players. The incumbents have worked very hard to prepare products that can suit the consumer's needs well while addressing the affordability of Indian consumers. Companies have also worked well on more miniature packs to make purchasing convenient. The incumbents realize the importance of creating an intense network to reach the deep parts of India. The focus of the companies is on offering natural fruit juices without preservatives. The rivalry among the players is intense. Rooh Afza fusion by Hamdard needs to carve its strategy to compete with existing players.

Opportunities for Hamdard Rooh Afza Fusion Juices

The company has leveraged its 100 years of connection with the Indian market by offering a product that has bright chances to pick up in the market. Indian Consumers are looking for healthy products with good taste and hygienic packaging. They want out-of-home alternatives that can be carried and consumed with ease and comfort. India currently has maximum youngsters who are fitness freaks and looking for healthy options. The market is growing at a tremendous pace due to the increased purchasing power of people. Blending Rooh Afza with flavours widely accepted by the consumer of India creates a great business opportunity for the company. The fruit juices offered on Rooh Afza is a 'Brand Extension Fit' catering to a broader consumer base with a different product category. (Hamdard to Blend RoohAfza with Fruit Juices - The Hindu BusinessLine, 2016)

Challenges for Hamdard Rooh Afza Fusion Juices

The market is already in the grip of big brands that are well-established names in the fruit juice market. Brands like Real from Dabur, Tropicana from PepsiCo, Minute Maid from Coca-Cola have captured a significant pie of the market of India and have been present in the market for quite along.

The Indian young consumers are also looking for products that match their needs and aspirations. For Hamdard, having fruit juices in the category might not be sufficient as people are looking for alternative juices with fruit pulp and fruit juices with no added sweetener. The incumbents have also created a great acceptance in the consumer's minds regarding the consumer's perceived benefits against the prices offered. Tapping rural India was also a challenge before the company. (Top 10 Best Fruit Juice Brands in India | Brandyuva, n.d.)

Road Ahead

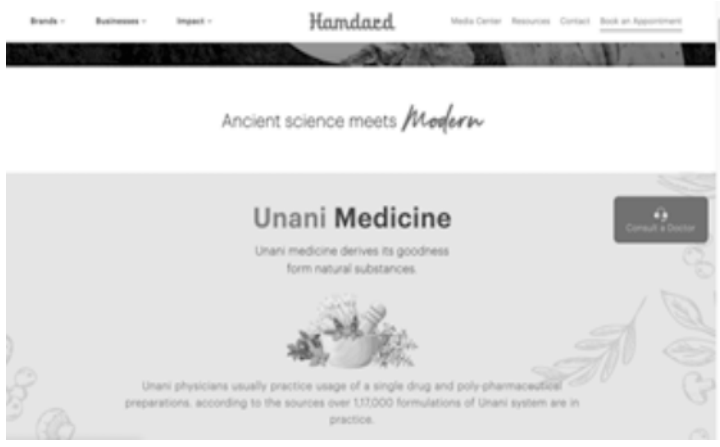
Rooh Afza fusion is a good brand extension in the existing portfolio of Hamdard. Still, the company needs to address a few challenges to leverage the old brand's iconic legacy.

Hamdard needs to carve out a strategy that allows them to create a large base of consumers. Today the enormous exposure of the consumer makes it compelling for the companies to make out the product that fits their priority. The thrust of consumers for quality products has increased without any doubt. The late entry in the fruit juice market of Hamdard, where existing market players already have a firm foothold, requires careful and robust strategies. The unique strategy to attract young consumers may not be a decisive move to capture India's market. The company needs a more comprehensive strategy to lure consumers of all ages.

For deep penetration in India, the company should create a different strategy to tap the Rural Market - which forms a larger market size of India. Tapping a market with significant and unique potential can work favoring the company.

Rooh Afza fusion needs a more effective communication strategy too, which should be beyond the confines of the digital marketing campaign to create an impact on youngsters of the nation and help the company reach a more extensive base of audience. Communicating value proposition suitable could help the company position its old brand with new and informed consumers.

The company needs to plan meticulously to combat the challenges posed by the external environment. In addition, Hamdard needs to leverage its unique experience of more than 100 years to devise a suitable strategy to outperform its rivals.



Exhibits 1 : About Company

Source: https://www.hamdard.in/

Exhibits 2 : Flavours of Juices

Source: https://www.businessinsider.in/adverg/brands/news/hatisinmdard-laboratories-india-launches-ready-to-drink-Rooh Afza-fusion-and-Rooh Afza-milkshake/articleshow/76400705.cms

Exhibit 3 : Digital Ad Campaign

Source: https://www.youtube.com/watch?v=Ewxr-tbO7vs

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FACIAL EMOTION RECOGNITION USING DEEP LEARNING: A SURVEY

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Abstract

Recognition of facial expression has been an important and exciting area of research in the past decade. It is still challenging due to high intraclass variations like facial expression, body posture, speech recognition, etc. There is an immense stipulation for facial expression acknowledgement in different areas like medical services, educational institutes, business, entertainment, e-commerce, health, and security. Face expressions play an essential role in identifying a person's emotions. To detect or identify someone's emotions, traditional approaches such as Local Binary Pattern (LBP), Scale-Invariant Feature Transform (SIFT), Histogram of Oriented Gradient (HOG) rely on handcrafted features, followed by a trained classifier on a database of photos or videos. The majority of the research studies perform reasonably well on datasets of images collected under controlled conditions but cannot perform well on more complex datasets with more image variation and partial faces. In recent years several research studies have suggested an end to end system for Facial Emotion Recognition (FER) using deep learning models. These studies have exhibited outstanding performance and show that deep learning-based FER performs better than a traditional approach based FER. This study provides an in-depth analysis of the existing research for facial emotion recognition through deep learning. Firstly, existing studies based on traditional approaches are analyzed, and then deep learning-based approaches used for FER are discussed.

Keywords: Emotion Recognition, Facial Expression, Facial Expression Recognition, Deep Learning.

Introduction

Emotion forms an indispensable part in any interpersonal; hence emotions play a vital role in human communication, which helps us to understand other people's intentions and moods. This area of research has attracted researchers for several reasons as human-computer interaction, which then helps in better advertising, animations, medicines and, security with improved human communication with the help of emotional quotient or emotional intelligence of a human being. One of the best parts about emotions is that they can be seen with naked eyes. Hence, any indication, preceding or subsequent signals, can be subject to identification and recognition using correct means. There are several ways to examine human expression recognition, ranging from facial expressions, body posture, voice tone, speech etc. Among these characteristics, for various reasons, facial expressions are one of the most common. They can be seen recognized and contain several helpful characteristics for emotional detection. It is comparatively easy to get an extensive dataset of faces. So, essentially FER is a method of identifying human feelings through facial expressions.

As per the feature representation, the system of FER can be categorized into two major categories, i.e. Dynamic Sequence FER and Static Image FER. Spatial information from a single image based on

static methods feature representation is encoded. In contrast, a temporal relationship in the input facial expression series among contiguous frames is considered in dynamic methods. Dynamic FER has a higher recognition rate than static FER as dynamic FER provides additional temporal knowledge. Psychologist Paul Ekman's work(Ekman & Friesen, 1976) has become imperative to the growth of this area.

In the early 20th century (Ekman & Friesen, 1976), research work identified six basic emotions, showing that humans interpret these emotions in a similar path irrespective of culture. The facial features are disgust, anger, happiness, fear, surprise and sadness. Later on, contempt and neutral was added as the fundamental emotions. Based on this concept, a Facial Action Coding System (FACS) was developed by Paul Ekman. Most of the facial emotion recognition studies nowadays are based on FACS.

There are mainly two approaches to identifying facial expression recognition by detecting the action unit (AU) and the facial points. FACS is a framework that is used to detect action units. FACS framework quantifies human facial expression by analyzing changes in the facial muscle when an emotion is triggered. FACS describes the facial muscle movement across 44 areas on the face or action units. Hence, facial expressions may be recognized through the presence and intensity of many AUs. When a framework is categorized by a rundown of prepared images from the given dataset, the captured photograph eventually contributes to discovering the individual's enthusiastic condition alongside his / her picture. It is called the Facial Emotion Recognition System.

The OCC (Ortony/Clore/Collins) model(Clore & Ontony, 2013) is another standard model that characterizes twenty-two types of emotions based on emotional responses to circumstances and is intended to model human emotions. On the other hand, the emotion model proposed by(Plutchik & Conte, 1997) is a dimensional model that provides an integrative theory based on the concepts of evolution and describes eight basic bipolar emotions.

The process of facial expression recognition is divided into four stages, i.e. image pre-processing, face detection, feature extraction and facial expression classification. Feature extraction is the most critical step and trickiest in recognizing facial expressions among all the steps. Once the feature extraction is done, the classifier divides the extracted features into the respective categories based on the classes of emotions.

There are several forms of feature extraction techniques at present, which can be split into texture feature-based, geometric based and the assortment of these two. The geometric-based approach uses facial features like nostrils, eye corners, etc., or facial elements like eyebrows, mouth, eye, etc. It shows the location and shape of facial components. Geometric feature-based methods have shown better performance than appearance-based methods. However, these methods typically require detecting facial components that are sometimes complex to accommodate in many cases. In order to track geometry-based recognition, two different types of models, the Active Appearance Model (AAM) and Active Shape Model (ASM), are used. ASM is a statistical model of object shape defined by a collection of points that iteratively deforms to match a new image.

On the other hand, AAM uses statistical model objects to fit a new image by shape and appearance. Appearance or texture-based approaches use the face's texture, which catches the strength changes associated with various expressions, like bulges, furrows, and wrinkles. Image filters work

with appearance-based methods like Gabor wavelets applied to a specific part of the entire face. However, the convolution of face images with Gabor filters consumes more time and space to derive coefficients of multi-scale and multi-orientation. Hence, the best option is to combine these two approaches for facial expression recognition.

Similarly, several conventional methods have been used to extract handcrafted features traditionally or by sparse learning. The LBP is a texture or appearance classification tool used as a visual descriptor in computer vision. It has been further analyzed that LBP combined with HOG gives better results (Alhindi et al., 2018). Another method, HOG, is a descriptor of features. The technique counts gradient orientation occurrences in localized portions of an image.

Similarly, SIFT is also an algorithm to detect local features in images. The other method SIFT relies on the appearance-based method and is invariant to the scale and rotation of the image. The critical limitation of feature-based approaches is that these require significant effort to design and employ different methods. The modern deep learning-based solution suggests overcoming this limitation, wherein a machine automatically extracts the facial features.

Two types of methods prevail in facial emotion recognition: Analytical and Holistic. The holistic method primarily aims to model human facial deformations that encode the entire face globally. On the other hand, to construct informative & expressive models, analytical methods scrutinize and quantify local or distinct human facial warp such as in eyebrows, eyes, nose, mouth, etc. and their geometrical relationships. Various technical advancements in machine learning have made it easier to identify emotions. However, there is a tremendous need for automatic detection of emotion from facial expression, and deep learning-based algorithms are outperforming it.

Deep learning extends an artificial neural network with representation learning (feature learning). and increasingly uses multiple layers to extract higher-level characteristics or features from the raw input. Deep learning, particularly convolutional neural networks, can extract and learn many facial features for a facial expression recognition system automated neural network & deep belief network. Most modern deep learning models, particularly Convolutional Neural Networks, are based on artificial neural networks. The coming section discusses significant studies conducted for facial emotion recognition with an explicit focus on deep learning techniques.

Literature Survey

In 1978 very first effort was made by(Sown et al., 1978) to analyze facial expressions automatically. A thorough investigation of the initial research studies on this topic is found in(Pantic & Rothkrantz, 2000; Fasel & Luettin, 2003). The study Initiated by(Tian et al., 2001) suggested identifying facial expressions using FACS. After that, several studies have discussed detecting AU occurrence and AU intensity, including(Tian et al. 2005). The different approaches detect distinct facial points and interpret the meaning of expression accordingly. Three significant steps are universal in automatic deep FER, i.e., pre-processing, deep feature learning, and deep feature classification. Out of these three, feature extraction and classification are two critical tasks in FER and Analysis (FERA). Most of the current FERA methods used different pattern recognition techniques to identify facial expressions based on facial characteristics, including approaches based on geometric features, appearance features, texture and hybrid features.

Some of the geometric features are Active Shape Model(ASM), extended ASM etc. A face detection

algorithm based on Haar-like features to detect faces is discussed in(Viola & Jones, 2004). A classifier is trained in the technique proposed by(Milborrow & Nicolls 2008), further extending the original ASM. The improved ASM proved more efficient and accurate in practical applications as it detects the eye and mouth centres to offer correct initialization.(Pantic & Rothkrantz, 2000) extracted the outline of the face components like the mouth, eyes and profile contours. Based on these contours and rule-based reasoning, thirty-two individual facial Action Units (AU) occurring in combination or alone are identified. The study claims eighty-six per cent (86%) of the average recognition rate using their proposed method.

In order to recognize facial expressions, appearance-based features are also used.(Liu & Wang, 2006) used a combination of neural network and Gabor features to offer improved accuracy than the original Gabor system.(Bartlett et al., 2006) proposed a system that selects a subset of Gabor features and trains an SVM classifier.(Whitehill & Omlin, 2006) explored the characteristics of Haar and the AdaBoost for identification of facial action unit that yielded the recognition rates with the SVM approach are equivalent to those of the Gabor but works faster.

A method presented by(Ying et al., 2010) was based on sparse representation and using the local binary patterns (LBP) from facial images; they believed that the proposed approach worked better than conventional LDA and PCA algorithms.

To extract the most discriminating LBP functionality, they formulated Boosted-LBP, and the best accuracy was achieved using an SVM classifier. For low-resolution face images, LBP produces stable and robust outcomes.(Shan et al., 2009).

[Lucey et al., 2010) made use of the Active Appearance Model (AAM) and classified seven facial expressions of a human face using the Extended Cohn Kanade (CK+) database along with SVM. Their classification was based on canonical normalized appearance characteristics, geometric shape characteristics, and combined shape characteristics. They exhibited that the combined characteristics have a greater identification rate than geometric shape features or appearance-based features. The AAM was used by(Mahoor et al., 2011) to detect positions of facial points; they extracted Gabor characteristics then presented a sparse representation based method to classify facial expressions with comparable outcomes.

The study mentioned in(Chen, 2012) compares the performance (in terms of recognition rate) between hybrid feature method and Active Appearance Model that used the CK+ database is classified by SVM classifier. The hybrid function approach gives 95% accuracy in recognition, which performed better than the other approach, giving 83.3 per cent accuracy. After extracting the feature, a classifier is used to identify the expression from the extraction. In order to identify facial expressions, various techniques have been suggested, such as rule-based classifiers, Support Vector Machine (SVM), Neural Network, Bayesian Network (BN), K-Nearest Neighbor and Random Forest.

In recent times, deep learning techniques have drawn much attention, and tremendous research interest has arisen in the study of deep learning approaches to detect facial emotions. Deep learning methods have been tested to identify facial emotions and are primarily focused on supervised learning.

In 2002, the CNN was introduced to classify facial expressions to address the commonly come

across problems of face expressions and irregular elucidation.

A CNN-based series of FER systems developed that, by training a multi-task deep neural network to recognize facial expressions, could predict the positioning of facial feature points. In the case of previously unseen variations in facial pose, a convolutional neural network behaves better than multilayer perceptron (MLP)[Fasel, 2002).

[Cohen et al., 2003) compared various classifiers of Bayes, and among all Gaussian Tree-Augmented-Naive (TAN), Bayes showed the most excellent performance.(Bartlett et al., 2005) systematically compared various techniques for facial expression recognition, including AdaBoost, LDA and SVM, and obtained the most excellent results by using AdaBoost and selecting a subset of Gabor filters. Further, the model is trained using the SVM model.

Much progress has been made for deep learning-based FER in the last decade. Deep CNN and Filter banks recognized emotions from face images(Huang et al., 2016). The study mentioned in(Stolar et al., 2017) concludes that image spectrograms with deep convolutionary networks can also be implemented to perform FER.

The study in(Khorrami et al., 2015) demonstrated that CNNs could attain high emotion recognition accuracy.(Aneja et al., 2016) proposed a model based on deep learning for facial expression recognition for stylized animated characters. The model is trained using human facial expressions and animated faces and mapping human images into animated ones.

A deep network proposed by(Mollahosseini et al., 2016) comprises two convolutional layers, each accompanied by using maximum pooling, followed by four Inception layers, is defined in(Bartlett et al., 2006; Cohen et al., 2003). The network is defined as the architecture of a sole part that takes registered facial images as input and categorizes them into six fundamental expressions or neutral expressions. The method records 66.4 per cent accuracy on the FER dataset. To simulate the temporal behaviours of facial expressions from image sequences, Hidden Markov Models (HMMs) have been commonly used(Cohen et al., 2003).

Dynamic Bayesian Networks (DBNs) have been used to recognize sequence-based expressions in (Kaliouby & Robinson, 2005; Zhang & Ji, 2005). Deep Belief Network (DBN) has obtained important results for facial expression recognition combined with other approaches. For FER(Jung et al., 2015), the powerful classifier AdaBoost and DBN approach had a high expression recognition accuracy rate of expression recognition.

A novel method for extracting salient features from deep faces was proposed, i.e. MLDP-GDA (Modified Local Directional Patterns GDA (Modified Local Directional Patterns, Generalized Discriminant Analysis), which was applied to DBN for training various facial expressions(Uddin et al., 2017).

Deep belief networks and hidden Markov models with unweighted average recall (UAR) has also been used to detect emotions(Hairar et al., 2017). Among the studies discussed above, Most of them achieve substantial performance progress compared to the conventional emotion recognition works, but attaining the relevant emotion detection facial regions seems to be lacking. A framework on the attentional convolutional network was proposed to address this issue that focused on salient face regions and dramatically improved on multiple datasets(Singh & Kaur, 2018).

Inception net v3 model that is a CNN architecture from inception family trains a model of emotion detection and is used for automated image classification and image labelling. It interprets and identifies the emotions from the spectrogram of an image. The spectrogram is nothing but an image from which emotion can be recognized. After refining the structure, every level shows the value of the emotion to be estimated by the trained Model. Transfer learning is also used in this Model. Using this Model, an accuracy of 35.91% per image spectrogram was achieved. It was observed that precision was very low(Roopa, 2019). The model proposed by(Singh & Kaur, 2018), is implemented on the Image Net dataset to see the effects of image recognition 41% accuracy was achieved by the Model.

To detect the occurrence of Action Units, automatic extraction of features is done using a deep convolutional neural network. The observation is that the mean square error (MSE) decreases when the training data raises, and MSE is linear with the size of testing data.(Liliana, 2019).

The research work mentioned in(Li & Deng, 2020) is a systematic, thorough analysis of deep learning for FER tasks based on both dynamic and still images and an overview of the network design and performance of the existing deep FER systems.

For 3D face recognition, Microsoft Kinect is primarily used in(Tarnowski et al., 2017) because of its low price and simplicity. The Kinect system calculated six Action Units (AU). For Emotion recognition using deep learning, an exhaustive study is given in)Li & Zhao, 2019; Giannopoulos et al., 2018), representing the study of classifier for face emotion recognition from machine learning to deep learning, its dataset properties & their respective results.

Conclusion

Recognition of facial expression is a very complex area of research and is still in the elementary and exploratory phases. This paper discussed various techniques for facial emotion recognition, emphasizing deep learning-based techniques. It has been observed that deep learning models are widely used due to their excellent feature-learning ability. However, most of the models are of greater time complexity in terms of the training period taken. There is still a necessity to develop models with lesser time complexity.

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LINKING SELECTIVE HIRING TO COMPETITIVE ADVANTAGE IN HOSPITALITY INDUSTRY

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Abstract

Human Resource works as a strategic partner in an organization. An organisation cannot succeed without attracting and retaining the right people, on the right job, with right skills and training. This paper is intended to find out the significant relationship between Selective Hiring and Competitive Advantage in hospitality industry. The research is based on primary data collected from 500 employees working in five-star hotels of National Capital Region (NCR) & selected cities of Rajasthan. Descriptive research design was adopted in the research. Statistical techniques like Pearson correlation, Multiple Regression and f-test were employed to measure the significance and strength of the relationship between Selective Hiring and Competitive Advantage. Further, finding showed that there is a significant relationship between Selective Hiring and Competitive Advantage.

Key Words: Selective Hiring, Competitive Advantage, Human Resource Management.

Introduction

The hospitality industry is a prominent sector among the flourishing service industries of the Indian Economy. They maintain the quality of manpower. The Hotels believe in “Human Factor” as a source of competitive advantage. Traditionally organisations consider financial resources, economies of scale and technology as a source of creating value. But, these resources are not adequate in today's era. In such a case, human resource practices have achieved an exceptional importance as a source of sustainable competitive advantage (Jackson and Schuler, 1995). The presence of highly skilled and quality employees gives an organisation sustainable competitive advantage over its competitors. The success of the firms is invariably depending upon the efficiency and effectiveness of its people. Consequently, recruitment and selection is very important practices of HR department that should be provided all the attention and relevance it deserves; the voyage of success is all the way depending on recruitment and selection practices of the firm (Peter, B., & David, N. 2020).

Literature Review

Selective hiring includes recruitment and selection both. Edwin B. Flipoo (1984) “A process of searching for prospective employees and stimulating and encouraging them to apply for jobs in an organization”. Therefore selective hiring is a method of recruiting and selecting the right kind of people with suitable distinctiveness at the right time, at the right place.

Research highlights that organizations can achieve sustainable competitive advantage through its people (Barney, 1991). According to (Fiorito et al., 2007) selective hiring includes numerous activities to maintain a proper match between job and job applicant, and a conscious effort is made by organisations to select best talent from the market and retain them by offering higher compensation. (Berger and Ghei, 1995), “Selecting an effective employee and hiring him is critical for the successful hotel operations”. They mentioned that an effective employee cannot work in an inefficient

organisation structure, simultaneously best organisations function poorly when staffed with ineffective workforce. Furthermore, labor turnover is increasing rapidly in hotel industry (Kennedy & Berger, 1994) hiring of employees is measured as a crucial instrument in addressing labor shortage. (Schuster, 2004) opined that selective hiring yield profits, increase organizational performance, boost employee productivity and reduce turnover. Successful hiring leads to higher productivity and economic growth (Paul & Anantharaman, 2003).

In the current study, Selective hiring may be considered as a source of competitive advantage for two important reasons. Firstly, when employees know that the company has made so much effort and invested substantial energy and money to recruit them, they may believe that the organisations value their people and are committed towards them. As a result they also reciprocate the same obligation to repay the organisation through increased commitment (Fiorito et al., 2007). Second the cautious effort of matching a job applicant with job requirement may lead to higher productivity and person-organisation fit, which may lead to greater commitment and substantially support competitive advantage (Caldwell, Chatman, & O'Reilly, 1990).

Objectives

The objective of the study is to understand the Selective hiring and Competitive Advantage factors in hospitality industry and to identify the significant relationship between Selective Hiring and Competitive Advantage.

Hypothesis

H01 There is no significant relationship between Selective Hiring and Competitive Advantage in Hospitality Industry.

HA1 There is a significant relationship between Selective Hiring and Competitive Advantage in Hospitality Industry.

Methodology

Descriptive Research design was used for the collection of the data through structured questionnaire. The main focus of the study is to collect more and more information from the managers through structured questionnaire. The universe of the study was 500 employees of Five-Stars Hotels of National capital region (NCR) & selected cities of Rajasthan.

Data Analysis and Presentation

Descriptive statistics were used to analysis the data. F-test was used to test the hypothesis. Multiple Regressions and correlation was applied to identify the effect of Selective Hiring on Competitive Advantage of the firm and to check whether the correlation between the variables is significant or not. Selective Hiring was considered as an independent variable where as Competitive Advantage was dependent variable.

Values of the correlation coefficient are always between – 1 and +1. Further F-test was also calculated to check the validity and level of significance. Null hypothesis acceptance and rejection depends on the p-value obtained. The test was done at $\alpha = 0.05$ level of significance.

Findings

The new employees are hired in the organisations on the basis of merit as per the behavioral tests

indicated by 65.2% of the respondents. It is also found that organisations are very selective during their hiring process as they believe that it is the only way to reduce the employee turnover. They maintain high standards and utilize a variety of standardized skill and assessment programs in hiring process. A candidate has to go through multiple selection rounds. It was found that organisations mainly prefer management trainees for their jobs.

Relationship between Selective Hiring and Competitive Advantage

According to the analysis Competitive Advantage and Selective Hiring has a positive correlation which means the extent to which selective hiring increases, competitive advantage will also increases. Pearson Correlation value which is 0.518 and significance value is 0.000 which represents that there is a statistically significant correlation between selective hiring and competitive advantage. **(Refer Table 1)** (Naveen and Raju, 2014) concluded that selective practices of recruitment and selection contribute towards better organizational outcomes. (Peter, B., & David, N. 2020) and several authors identified that the occurrence of skilled human resource helps organisation to have sustainable competitive advantage. Having the right kind of people at right job helps an organization to remain competitive in the market.

Table 1: Correlation Analysis between Selective Hiring and Competitive Advantages

Descriptive Statistics			
Dimensions	Mean	Std. Deviation	N
Competitive Advantage	3.6715	.52735	500
Selective Hiring	3.6468	.60953	500

Correlations			
	Dimensions	**Competitive Advantage**	**Selective Hiring**
Pearson Correlation	Competitive Advantage	1.000	.518
	Selective Hiring	.518	1.000
Sig. (1-tailed)	Competitive Advantage		.000
	Selective Hiring	.000	
N	Competitive Advantage	500	500
	Selective Hiring	500	500

Source: Primary Data

Hypothesis Testing

H01 There is no significant relationship between Selective Hiring and Competitive Advantage in Hospitality Industry.

The study model to be tested was: (r=0.518, p-value<0.001)

$Y = ß0 + ß_1X_1 + ε$

Where:

Y=Competitive Advantage

ß0= Constant

X_1= Selective Hiring

E= Error Term

The built-in equation model for establishing competitive advantage in the regression formula therefore is Y=0.518 It states that standardized competitive advantage will increase by 0.518 units with one unit increase in selective hiring. Thus results of the study indicate that selective hiring will enhance competitive advantage.

To validate the overall linear regression for this factor in the regression model F-test was calculated. Where CA is Competitive Advantage and SH is Selective Hiring.

Table-2: Multiple Regression Analysis

Model Summary[b]									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.518[a]	.268	.266	.45168	.268	182.199	1	498	.000
a. Predictors: (Constant), SH									
b. Dependent Variable: CA									

Model summary explains that how much of the variation in the value of the dependent variable is explained by regression model. In the Model Summary in above table, *R Square is 0.268*, which indicates that 26.8 percentage of the variation in Competitive Advantage can be explained by variability of Selective hiring. **(Refer Table 2)**

Table 3 : ANOVA

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	37.172	1	37.172	182.199	.000[b]
	Residual	101.601	498	.204		
	Total	138.773	499			
a. Dependent Variable: CA						
b. Predictors: (Constant), SH						

Table 3 gives the value of the ***F-statistic is 182.199*** and its ***significance level is 0.000***, this shows that the Selective Hiring statistically significantly predicts the Competitive Advantage.

Table 4 : Coefficients

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.038	.123		16.620	.000
	SH	.448	.033	.518	13.498	.000
a. Dependent Variable: CA						

Source: Primary Data

Table 4 shows the standard coefficients value where ***β coefficient of SH is 0.518, t value is 13.498 and sig. value is 0.000*** which means null hypothesis is rejected which indicates that there is no significant relationship between Selective Hiring and Competitive Advantage in Hospitality. The result of the study shows that Selective Hiring has a positive relationship with Competitive Advantage that could be statistically proved. These results are harmonious with the findings of previous studies by (Narang. G & Sharma. A, 2014) reported that Selective Hiring is the first step in achieving edge over competitors. Organisations follow the approach of selecting the right person for right job takes organisations towards higher growth. (Mathur, 2015) also concluded that competitive advantage can be achieved through employees by recruiting the right kind of people at right job and by engaging their efforts at the right direction.

Conclusions

It was established that there is a significant relationship between selective hiring and competitive advantage. Selective hiring has the highest weighted mean when linked with competitive advantage of the firm. So to gain competitive advantage an organization has to focus on selective hiring, where hiring is based on matching the skills, attributes, knowledge required for the job with employee knowledge and skills that will lead towards the commitment. According to (Abdullah & Ramay, 2012) to remain committed is an obligation for the employee that always makes him responsible to perform and to stay motivated in the organization. (Pahuja.S & Garg.P, 2021) also concluded that there is a positive correlation between recruitment and competitive advantage. Selective hiring, nurturing and retaining the pool of talented employees is the at most priority of organisations to reduce the attrition rate and improve the organisation culture (Immaneni et al., n.d.). To gain maximum advantage organisations should encourage fair recruitment and selection criteria in effective and efficient manner. Thus, it is concluded that Selective Hiring leads to high level of competitive advantage in hospitality sector.

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KITKAT INDIA'S TRAVEL BREAK PACK CAMPAIGN: CELEBRATING CULTURE, ART, OR HURTING SENTIMENTS?

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Abstract

Nestle India was the target of social media vitriol for a wrapper design for one of its famous chocolate KitKat in January 2022. Numerous consumers used social media to mock the KitKat wrapper for offending the Hindu community's religious sensitivities since the wrapper featured images of Lord Balabhadra, Jagannath, and Mata Subhadra. As a result, many pieces of KitKat had to be taken off the market. Earlier, this campaign was also adversely trolled on social media for its factual error. Nestle KitKat is known for its creative campaigns. Should the company continue with the current campaign, irrespective of the recent setbacks, or choose a different campaign to attract young customers? Could the recent backlash be seen as a catalyst for reassessing the brand? The decision could have an impact in the long run and could also harm intermediate businesses.

Keywords: Social Media, Campaign, Nestle, Controversy Backlash, Chocolate.

About Nestle India

In 1912, "The NESTLÉ Anglo-Swiss Condensed Milk Company (Export) Limited" established a foothold in the Indian market when it started exporting finished products. In the post-Independence era, when the Indian government's economic policies encouraged local manufacturing, NESTLÉ established its first plant in India in 1961 in Moga, Punjab. Additionally, it developed agricultural services to educate, advise, and assist farmers in many areas. They worked on increasing the milk output of cows, upgraded dairy farming practices, applied science to crop management, and supported people in securing bank loans. Progress included the continual and sustained generation of prosperity, culminating in the makeover of the village of Moga into a thriving and active milk region and a thriving industrial hub.

For more than a century, NESTLÉ India has been a partner in the country's growth and created an unmatched alliance of trust with the Indian people. Around one million people in India have benefited from their efforts, including merchants, suppliers of packaged goods, farmers, and other stakeholders. The company is devoted to continually improving its awareness of Indians' changing lifestyles and anticipating consumer requests to provide delicious, nutritious, and healthy product options. The company's culture of renovation and innovation and its access to the NESTLÉ group's centralised R&D facilities and proprietary tech/brands expertise are a significant advantage for these undertakings. NESTLÉ India manufactures international products under globally popular names like "NESCAFÉ, MAGGI, MILKY BAR, KITKAT, BAR-ONE, MILKMAID, and NESTEA." Additionally, it recently launched goods for daily consumption and usage, including "NESTLÉ Milk, NESTLÉ SLIM Milk, NESTLÉ Dahi, and NESTLÉ Jeera Raita." NESTLÉ India is a socially responsible corporation committed to improving the quality of life for the communities with whom they work. (Nestle India Share Price Live Today - Why Nestle India Share Price Is up by 0.14% Today? Nestle India Share Price Analysis | ETMarkets, n.d.)

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The Chocolate Industry in India

India's chocolate market was worth $1.9 billion in 2020 and is expected to expand at more than 16% CAGR to reach $3.3 billion by 2023. (India Chocolate Market 2023 Size, Market Share & India Chocolate Market Forecast & Analysis | TechSci Research, n.d.) This looks possible due to the country's growing younger generation, globalization, and a growing culture of gifting chocolates. India is currently also becoming one of the fastest-growing chocolate markets globally. Over the last decade, India's rapid economic development has stimulated rising per capita disposable income, resulting in the chocolate sector growing fast. Consequently, people purchase chocolates regularly rather than simply for special occasions. Another significant reason propelling the chocolate sector is the country's large young population, a valuable segment for chocolates. Half of India's population is under the age of 25, and two-thirds are under 35, who crave for chocolates and are significant buyers of them.

Additionally, changing lifestyles, westernization, the rise of the food services industry, and value addition contribute to the market's growth. Chocolates have also supplemented traditional sweets in Indian households. “The chocolate market in India has a well-entrenched presence of global companies as well, like Mondelez India, Ferrero India, Nestle India, Mars International India, Gujarat Cooperative Milk Marketing Federation (Amul), Hershey India, Global Consumer Products, Surya Food and Agro, Lotus Chocolate Company, ITC Limited.”

Ferrero, Hershey's, and Lindt have a significant position in the luxury chocolate industry. Cadbury has a market share of around 65-70 percent in the chocolate confectionery industry, followed by Nestle, with a market share of approximately 20%.

Travel Break Campaign

KitKat's “Have a break, have a KitKat” marketing campaign has been engaging customers with the concept of having distinctive vacation getaways with Nestle KitKat for years. The “My Travel Break” campaign began in 2017 with the release of four video series. (KIT KAT's New Ad Campaign Promises Viewers an “enchanting” Virtual Travel Break, Marketing & Advertising News, ET BrandEquity, n.d.) This campaign primarily focused on promoting unique, lesser-known Indian tourist destinations to bring travel experiences to life. This campaign was curated to create a tranquil escape from routine life, and as such, the company released a series of advertisements portraying the peace and beauty of India's treasures of travel destinations. For the travel break campaign, Nestlé KitKat's printed rating of places, and different vacation destinations are printed on the wrapper of KitKat chocolate packets and created four videos each portraying awe-struck moments, Tranquillity, picturesque spots around these surreal, Valley of Flower, Puducherry, Alleppey, and Nubra Valley amongst others. Hemis National Park, where the wanderers may witness a rare snow leopard in its natural habitat, and Sandakphu, where four of the world's five highest peaks are visible. Additionally, the advertising emphasised offering thorough travel recommendations to clients through facebook.com/travelbreaks. (**Exhibit 1)** (Nestlé KITKAT Launches Third Edition of “My Travel Breaks” - Exchange4media, n.d.)

In 2018, KITKAT released a unique vacation break bundle, including Goa's fascinating unplumbed travel destinations. In addition, Nestlé India partnered with Goa Tourism and Drishti to train lifeguards, cruise crew workers, cleaners at the beach, and water sports organizers throughout Goa

to improve travellers' experiences at the beaches Goa. (Nestle Launches Goa Edition of "KitKat Travel Break Pack" - GoGoaNow ! Goa Events, n.d.) **(Exhibit 2)**

The entire campaign was inspired by unique, lesser-known Indian tourist destinations to create a magical travel experience. While selecting destinations for the campaign, Nestle KitKat focused on individual experiences, Instagram-worthy locations, authentic local food, and shopping destinations. Nestle partnered with Tripoto, an independent community platform for travel, intending to educate young travellers about the facts and serenity of these Indian travel destinations. (KitKat Reveals Unique Travel Destinations in India on Tripoto Microsite in 'My Travel Break" Campaign,' n.d.)

KitKat's Social Media Controversy

The campaign drew the ire of a group of netizens who felt that the corporation should eschew utilising Hindu gods on wrappers. Influential backed the protest, writing that businesses should concentrate only on selling their goods and shun religious feelings and egregious misuse of facts. **(Exhibit 3)** Nestle India has apologized after encountering flak for including photos of Lord Balabhadra, Jagannath, and Mata Subhadra on the packaging of KitKat. Many people on social media chastised the corporation, claiming that the controversial wrapping had hurt their feelings. (Lord Jagannath's Image on KitKat Wrapper Sparks Outrage Online, Nestle India Apologises | Trending & Viral News, n.d.)

Although it was an honor to have Odisha represented by the international corporation, but numerous people felt that this kind of representation was concerning and an affront to the state's culture. Some individuals even vowed to boycott the firm. The problem started when several consumers shared photographs of the new KitKat chocolate covers on social media. (Nestle India Yanks KitKats Featuring Indian Gods after Consumers Call Them Disrespectful | Fortune, n.d.) Many people believe that after people consume the chocolate, the wrappers with pictures of Lord Jagannath and his siblings would be found in dustbins and on the street. (Lord Jagannath's Pic on KitKat's Wrapper Sparks Outrage on Social Media. Nestle India Reacts - Trending News News, n.d.) **(Exhibit 4)**

Nestle has issued an apology for the incorrect representation of Manipur's Keibul Lamjao National Park on KitKat wrappers. (Nestle Apologises for Wrong Depiction of Keibul Lamjao National Park on KitKat Packaging - The Economic Times, n.d.) They apologized to the state government for incorrectly placing Manipur's Keibul Lamjao National Park in Meghalaya on its packaging. A Red Panda was also shown on the specific KitKat travel break chocolate boxes. **(Exhibit 5)** Manipur's forest authorities notified them that the park is in Manipur. The Keibul Lamjao National Park does not have this species. A. K. Joshi, Manipur's main chief conservator of forest (wildlife), pointed out the discrepancy in a letter. Keibul Lamjao National Park, the world's only floating national park, is situated in Manipur's Bishnupur district. **(Exhibit 6)**

Conclusion

Since the withdrawal of KitKat packages from the market, there has been no discernible shift in the company's marketing approach. (Nestle India Faces Backlash for Using Lord Jagannath's Picture on KitKat Wrapper, Issues Apology, n.d.) The most obvious indicator of a reaction was the apology and explanation, which said that the government tourist website inspired the ad image to educate people about art and its craftspeople. (Exhibit 7) Our previous ads have shown that customers like collecting and retaining such gorgeous patterns. Nestle India said that they recognize the situation's sensitivity

and apologize if they mistakenly offended anyone's emotions. What mitigating approach or activities may KitKat adopt to rehabilitate its reputation? Or, was it a well-executed effort by Nestle India KitKat to attract unfavorable attention, change the routine, and get the attention of customers, because this kind of error was not anticipated from Nestle. However, advertising efforts designed to annoy your customer may work in either direction — it is a double-edged blade that's commonly mistaken for witless sloganeering.

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Exhibit 1: Travel Break Campaign Pack Images of KitKat

Source: https://brandequity.economictimes.indiatimes.com/news/marketing/kit-kats-new-ad-campaign-promises-viewers-an-enchanting-virtual-travel-break/59709165 accessed on January 10, 2022.

Exhibit 2: KitKat Release - A Unique Vacation Break Bundle Including Goa's Fascinating Unplumbed Travel Destinations

Source:https://gogoanow.com/nestle-launches-goa-edition-kitkat-travel-break-pack/ accessed on January 13, 2022.

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Exhibit 3: KitKat Image with the Wrapper of Lord Jagannath

Source: https://keralakaumudi.com/en/news/news.php?id=734552&u=hindu-gods%E2%80%99-images-on-kitkat-cover-nestle-lands-in-trouble accessed on January 10, 2022.

Exhibit: 4 Tweet Reactions for including photos of Lord Jagannath, Balabhadra, and Mata Subhadra on the wrapper of KitKat Chocolates

Source: https://www.indiatoday.in/trending-news/story/lord-jagannath-s-pic-on-kitkat-s-wrapper-sparks-outrage-on-social-media-nestle-india-reacts-1901795-2022-01-19, accessed on January 12, 2022.

Exhibit 5: Nestle's Factual Errors and Backlash Messages on Social Media

Source: http://www.discovereast.in/food/nestle-extends-apology-for-factual-error-announces-two-kitkat-packs-celebrating-northeast/accessed on January 10, 2022.

Exhibit 6: The new KitKat pack – Factual Error on Nestle Travel Pack (Photo: Nestle India)
Source: https://www.adgully.com/twitterati-simmer-at-nestle-s-kitkat-s-failure-to-get-their-facts-right-103154.html accessedbon January 11, 2022.

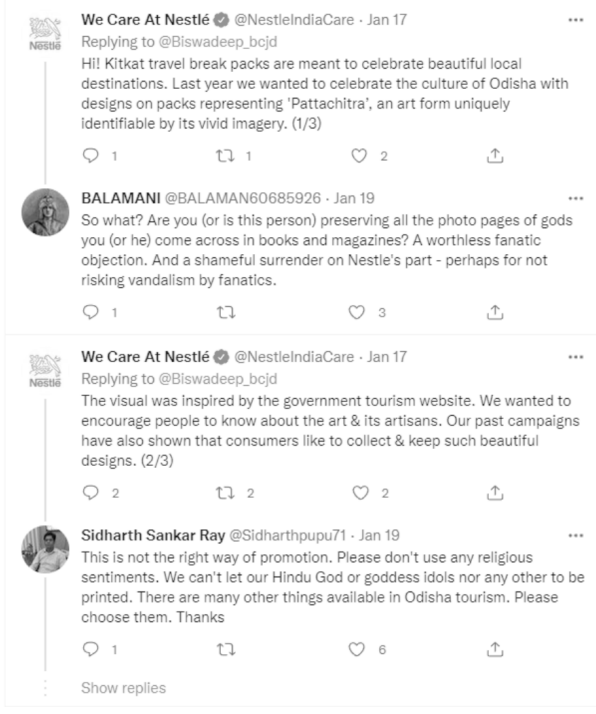

Exhibit 7: Nestle India's appologise
Source: https://www.indiatoday.in/trending-news/story/lord-jagannath-s-pic-on-kitkat-s-wrapper-sparks-outrage-on-social-media-nestle-india-reacts-1901795-2022-01-19, accessed on January 12, 2022.

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WORK LIFE BALANCE: A HOLISTIC REVIEW OF THEORETICAL CONCEPTS

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Abstract

Work-life balance (WLB) has made remarkable development in the field of research during the last decade. Even though there is extensive literature available to support the concept, and contextual attempts have been made thoroughly, the current study shall provide a much more precise and concrete literature for researchers. The review encompasses work from the field of HR, OB and few multidisciplinary research articles as a reference to explain WLB theories. The major theories that have been covered in the paper are Segmentation Theory, Enrichment/enhancement Theory, Facilitation Theory, Spillover Theory, Social identity Theory, Compensation Theory, Congruence Theory, Conflict Theory, Human capital Theory, Instrumental Theory, Resource drain Theory, Conservation of resources Theory, Ecology Theory & Border Theory

Keywords: Work-life balance, WLB, WLB theories.

Introduction

In the context of work and family study, the major challenge is availability of general or universal framework that can define the relationship between both. There is no unique integrated framework or model which is universally accepted (Pitt-Catsouphes et al., 2006). Various researchers have made significant but wide-ranging contribution in compiling the theoretical framework (Zedeck and Mosier, 1990; O'Driscoll, 1996; Clark, 2000; Guest, 2002; Morris and Madsen, 2007), which comprises following major theories (Zedeck and Mosier, 1990; Frone et al., 1992; Clark, 2000; Edwards and Rothbard, 2000; Frone, 2003; Greenhaus and Powell, 2006; Krouse and Afifi, 2007; Bakker et al., 2009). These include:

- Segmentation Theory
- Enrichment/enhancement Theory
- Facilitation Theory
- Spillover Theory
- Compensation Theory
- Conflict Theory
- Border Theory

This research paper is an attempt to stipulate the equation that signifies the cross relationships between the two aspects of an individual's life within the framework of previous literature. Moreover the paper is focused on the basic theoretical approaches that link the work domain and life domain of an employee. Various theoretical frameworks and subsequent suggestions have been made and presented which range from complete separation of both spheres to full integration.

Though some of the theories do overlap in some aspects, ample literature is available to make

distinction between the distinct approaches and their results. This is quite notable that where some theories have been accepted more widely than others, pragmatic results do exist in support of every approach, hence making it problematic for researchers to stick to a single point of view.

The current literature is not comprehensive in nature but a holistic preview of various theoretical approaches designed and implemented in the field of work life balance.

Objectives and Methodology of the Study

Work-life balance is becoming one of the most crucial problems faced by not only employees but also the organization in retaining quality workforce. One the same end, researchers are putting more and more effort into studying issues or work life globally. Having said that, it is still a gap that very few attempts have been made in compiling ample theories (Guest, D. 2001).

Majority of the reviews are either focused on defining the relationship between work and life or conceptualizing variables having impact on work life balance but comparatively less literature is present in the context of stated titles. Though every review provides a new insight and solid results in defining the relationship between the two spheres but fail to provide a comprehensive review of WLB theories. Lack of such literature creates a gap between understanding and application of theories in the field of WLB problems by the researchers.

Hence, the current study is an attempt to fill the gap and furthermore to summarize the theoretical concepts from 1960 to 2014 fulfilling the intention of compiling the theoretical work in chronological order. This literature could provide a theoretical base to other researchers who are willing to contribute in the discipline of WLB research.

For the purpose of collecting relevant data articles were identified using online databases as well as physical journals available in local research facilities. The study has been kept limited to the field of human resources and organizational behavior in order to justify the stated objective.

In nutshell, all the cited reviews have given specific and remarkable contributions in highlighting work related variables and family related variables at the same time. Nevertheless focus is still premised around work family propositions instead of holistic approach towards WLB.

Theories of Work Life Balance

Following theories are the major or commonly discussed propositions defining various sides of work family research that emphasizes work-life balance. Furthermore, the section also discuss is most prominent researches based on specific theories:

Segmentation Theory

Segmentation theory is the oldest approach defining the “relationship between work domain and family domain”. It suggests that both the domains are separate and independent from each other and do not interfere or leave any impact on each other.

Blood and Wolfe (1960), the forerunners of the theory or view firstly applied this to the blue collar workers and suggested that workers who are dissatisfied with their jobs, segmentation is a usual process. According to (Young and Kleiner, 1992), work and family drives separately and are distinct entities and possess “no relationship between work life and family life”. This theory clarifies zero impact in both experiences.

Lambert (1990) highlighted that segmentation is not a natural process but occurs because an individual thrives to separate work and family to cope up with work related stress. Parasuraman et al. (1992) presented a very in depth yet concrete study defining the dual career of couples. He found relation among work related variables and family related variables but within itself only. He explained work variables like role ambiguity, overload and conflict does have an impact on job satisfaction but these variables were not related to family satisfaction. Similarly family issues or parental problems affect family satisfaction but not job satisfaction. This study is a true explanation to the segmentation theory for the sample understudy.

Since segmentation theory is based on independent functionality of every domain, it is exactly opposite to spillover theory. Moreover this theory provides an insight as to how one can sort his/her work life from personal life. Family life is always counted by affection, intimacy, love and care whereas work life is a mirror of competition, productivity and materialistic goals (Piotrkowski, 1978).

The literature also provided relative terms like independence, detachment, separateness, compartmentalization and disengagement in support of the theory (Edwards and Rothbard, 2000).

Enrichment/Enhancement Theory

The theory was proposed by Seiber (1974) in a way which entails engagement of multiple roles which offers wide resources to be utilised by workers in a variety of roles. Marks (1977) proposed that humans have an infinite amount of energy and while participating in a distinct role it expands and therefore individuals utilise the energy in activities they enjoy.

Work life balance is not about the conflict that comes between work and family but also the positivity that transfers from one domain to another Frone (2003). According to (Verbrugge, 1986; Gove and Zeiss, 1987; Stephens et al., 1997) workers involvement in one sphere can leave a positive impact on the other.

Enrichment theory explains the continuum between instrumental sources like knowledge and skills and affective sources like satisfaction and how it leads to enhancing the values of other spheres (Morris and Madsen, 2007).

According to Greenhaus and Powell (2006) enrichment can be explained as the degree to which employees experience positivity in one domain due to another domain.

Facilitation Theory

This theory by far is an extension to the enrichment theory. The degree to which an employee's involvement in work domain may bring happiness and pleasure to the personal life domain (Marks, 1977; Thoits, 1991; Barnett and Hyde, 2001) or become easier by the knowledge and experiences one gains with involvement in another domain (Frone, 2003; Grzywaez, 2002) and is known as "work-family" facilitation. Work-family facilitation is a dual approach to define both "work-to-family and family-to-work facilitation". Work facilitates monetary resources and family facilitates emotional quotient.

Spillover Theory

A number of researchers highlighted that individuals carry emotions and values that develops at home within their work-life and vice-versa (Piotrkowski, 1979; Piotrkowski and Crits-Christoph, 1981; Crouter, 1984; Belsky et al., 1985; Kelly and Voydanoff, 1985). Staines (1980) explains the

spillover as a “dual zone relationship between work and family”, where positive experience in work would result in positive attitude in family and vice versa. According to Doby and Caplan (1995) perspective spillover creates a threat of reputation in an individual's mind. The study hypothesized that an employee experiences tension due to criticism or bad reputation and brings the behaviour in personal life.

Williams and Alliger (1994) suggested in their study that negative moods spill way too easily than positive moods. According to Sirgy et al. (2001) there are two types of spillover namely horizontal and vertical spillover. Horizontal spillover defines the connection between neighboring spheres whereas vertical spillover suggests the connection from top to bottom or vice versa in a single domain.

Compensation Theory

Piotrkowski (1979) suggested that male employees consider their home as a source of pleasure or satisfaction that is lacking in their work domain. Compensation theory intends to explain that workers compensate for their dissatisfaction in one domain by searching the satisfaction in other domains (Lambert, 1990). The theory also suggests that work and family life are pieces of same envelope but have a compensating sense on each other. If one finds distress in one domain the same could be compensated by another domain (Young and Kleiner, 1992).

Edwards and Rothbard (2000), presented two different kinds of compensation in their literature. Primary one is that an individual may decrease the engagement in dissatisfying domains while increasing the portion in comparatively satisfying one (Lambert, 1990). Secondly the individual may react to dissatisfaction by thriving for rewards in other domain (Champoux, 1978).

This theory also explains the compensatory outcomes between two forms of psychological interference: “work-to-family and family-to-work” (Greenhaus and Beutell, 1985; Lambert, 1990; Kossek and Ozeki, 1998; Kossek et al., 1999; Mac Dermind et al., 2002; Krouse and Afifi, 2007).

Conflict Theory

Conflict can be defined as a result of a clash between roles at work and home when one finds it difficult to fulfil the demands of one domain due to the other and also sometimes known as inter-role conflict theory (Greenhaus and Beutell, 1985). In few reviews the theory has also been termed as opposition or incompatibility theory (Edwards and Rothbard, 2000).

Guest (2002), proposed a model that explains how an individual has to take some hard choices due to high degree of demands in all domains of life. In other words an individual at times needs to sacrifice in one domain due the unfulfilled demands of other domain (Zedeck and Mosier, 1990).

Border Theory

This theory was an alteration to spillover and compensation theories which failed to explain the circumstances in which this situation occurs Clark (2000). He argued that though work and family are different but an interconnection still exists and individuals tend to overlap these domains to a certain level.

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Key Researches Based on Work-life Balance Models

This section highlights a brief of various researches conducted on the basis of various work-life balance models over the years. A concrete tabular review is presented including the sample of study and measures used.

Author(s)	Year of Study	Sample	Measures
Segmentation Theory			
Yang, Zhang, Shen, Liu, & Zhang	2019	350 Married employees from 81 distinct companies in China A representative group of 3-10 employees was chosen from each unit.	● Work-family Segmentation Preference (scale used developed by Kriener, (2006)) ● Work-related ICT Use (scale used developed by Boswell & Olson-Buchanan, (2007)) ● Work-family Conflict (scale used developed by Netemeyer et al., (1996)) ● Group Segmentation Norm (scale used developed by Park, Fritz,& Jex, (2011))
Derks, Bakker, Peters, & Van Wingerden	2016	71 Dutch employees	Trait Measures: ● Segmentation Preference (scale used developed by Kriener, (2006)) ● Workload (scale used developed by Bakker, Demerouti, Taris, Schaufeli, & Schreurs, (2003)) ● Demographics (gender, age, level of education, marital status and no. of children at home) State Measures: ● Daily work-related smartphone use during off-job time (scale used developed by Derks & Bakker, (2014)) ● Daily Work-family Conflict (subscale used from the scale developed by Netemeyer et al., (1996)) ● Daily Family Role Performance (FRP scale developed by Chen et al., (2014)).
Koch and Binneweis	2015	237 white-collor employees along with 75 supervisors working in an German organization	Supervisors: ● Work-home segmentation behaviour (Boundary strength at home scale used developed by Hecht & Allen, (2009)) ● Exhaustion and Disengagement (Oldenburg Burnout Inventory scale used developed by Demerouti, Bakker, Vardakou, & Kantas, (2003)) Employee: ● Work-life friendly role modelling (FSSB scale used developed by Hammer, Kossek, Yragui, Bodner, & Hanson's, (2009)) ● Employees' Job Involvement (scale used developed by Kanungo, (1982a))

Derks, van Mierlo & Schmitz	2014	268 data points collected from 70 participants for 4 successive days through diary questionnaire working in a German Company	• Daily smartphone usage after working hours (scale used developed by Derks & Bakker, (2014)) • Daily psychological detachment from work (psychological detachment subscale extracted from Recovery Experiences Questionnaire used developed by Sonnentag & Fritz, (2007)) • Daily work-related exhaustion (subscale of the Maslach Burnout Inventory (MBI) scale used developed by Byrne,(1991)) • Perceived segmentation norm (scale used developed by Kriener, (2006)) • Daily workload (scale used developed by Bakker, Demerouti, Taris, Schaufeli, & Schreurs, (2003))
Park, Y., Fritz, C., & Jex, S. M.	2011	431 alumni of U.S university with exclusive criteria of being a full-time employee commuting to work	• Segmentation Preference (scale used developed by Kriener, (2006)) • Perceived segmentation norm (scale used developed by Kriener, (2006)) • Psychological detachment from work (scale used developed by Sonnentag & Fritz, (2007)) • Demographics (age, marital status number of children under 18years of age) • Level of Job Involvement (scale used developed by Kanungo, (1982a))
Enrichment/enhancement Theory			
Adriel, K. S.	2013	306 Hotel employees (in Sarawak, Malaysia)	• Work-Family Enrichment (scale used developed by Carlson et al., (2006)) • Job Satisfaction (index used developed by Agho, Price, & Mueller, (1992)) • Family Satisfaction (scale (modified) used developed by Aryee, Luk, Leung, & Lo (1999))
Jaga & Bagraim	2011	336 employee working at a national retail chain (in South Africa)	• Job Satisfaction (scale used developed by Clark, (2001)) • Career Satisfaction (scale used developed by Greenhaus, Parasuraman, & Wormley, (1990)) • Work-Family Enrichment (scale used developed by Carlson et al., (2006)) • Family Satisfaction (scale used developed by Greenhaus et al. (1990)) • Demographics

Carlson, Hunter, Ferguson, & Whitten	2014	310 full-time employees in USA selected using Zoomerang (an internet-based service providers)	• Time frame 1
			  ○ Work-Family Enrichment (scale used developed by Carlson et al., (2006))
			• Time frame 2
			  ○ Positive mood (scale used developed by Watson, Clark, & Tellegen (1988))
			  ○ Psychological distress (scale used based on Ilfeld, (1976))
			  ○ Job satisfaction (scale used developed by Camman et al., (1979))
			  ○ Family Satisfaction (scale used developed by by Camman et al. (1979))

Carlson, Grzywacz, & Zivnuska	2009	685 full-time employees selected from Study Response database (working for 40 hours per week or more)	• Work–family balance (scale used developed by Grzywacz & Carlson, (2007)) • Work–family conflict (scale used developed by Carlson et al., (2000)) • Work-Family Enrichment (scale used developed by Carlson et al., (2006)) • Job satisfaction (scale used developed by Camman, Fichman, Jenkins, & Klesh, (1979)) • Organizational commitment (scale used developed by Balfour & Wechsler, (1996)) • Intention to turnover (scale used developed by Seashore, Lawler, Mirvis, & Cammann, (1982)) • Family satisfaction • Family performance (scale used developed by Williams & Anderson, (1991)) • Family functioning (Family Assessment Device (FAD) scales based on McMaster model of healthy family functioning developed by Epstein, Ryan, Bishop, Miller, & Keitner, (2003)) • Demographics
Michel and Clark	2009	187 employees from diverse industries in USA selected using Study Response	• Negative and positive affect (scale used developed by Watson et al. (1988)) • Work–family conflict (scale used developed by Carlson et al., (2000)) • Positive and Negative Affect Schedule (PANAS)) • Work-Family Enrichment (scale used developed by Carlson et al., (2006)) • Family and Job Satisfaction (Job Diagnostic Survey and family satisfaction developed by Hackman & Oldham, (1975))

Spillover Theory			
Powell and Greenhaus	2010	580 Part-time MBA students of US university	• Femininity (Bem Sex Role Inventory-BSRI scale used developed by Beere, (1990)) • Family role salience (job involvement scale used developed by Lodahl & Kejnar,(1965) • Preferred and actual segmentation of the work domain from the family domain (scale used developed by Kreiner, (2006)) • Work–family conflict (scale used developed by Carlson et al., (2000)) • Work-to family positive spillover (measure of positive spillover scale used developed by using Hanson et al., (2006)) • Career Success • Family Structure • Human Capital • Life Stage • Gender Identity
Allis & O' Driscoll	2008	In New Zealand, 938 government employees working in 86 different government workplaces in various departments and posts.	• Positive (facilitation) • Negative (conflict): spillover from two nonwork domains (family and personal benefit activities) to work • Psychological involvement: in work, family and personal benefit activities
Kinnunen, Feldt, Geurts, & Pulkkinen	2006	In the ongoing Jyväskylä Longitudinal Study of Personality and Social Development (JYLS) in Finland, 151 men and 134 women took part.	• Work -life interface (scale used developed by Frone et al., (1992a) and Netemeyer, Boles, & McMurrian (1996)) • Well-being Indicators (burnout inventory scale used developed by Maslach et al., (1996)) • Marital Satisfaction (Dyadic Adjustment Scale (DAS) developed by Spanier's (1976))

Scholarios & Marks	2004	333 employees from two IT Companies in Scotland	• Controlled Variables
			  ○ Age
			  ○ Marital Status
			  ○ Child Care or Dependent responsibilities
			  ○ Skill acquisition (scale used developed by Sturges, Guest, & Mac Davey, (2000))
			• Dependent variables
			  ○ Organizational commitment (scale used developed by Allen & Meyer, (1990))
			  ○ Extrinsic job satisfaction (Minnesota Satisfaction Questionnaire)
			• Inter mediating variables:
			  ○ Work-life boundary flexibility
			  ○ Negative work-to-non-work spillover (scale used developed by Greenhaus & Beutell, (1985))
			  ○ Trust in the organization (scale used developed by Cook & Wall (1980))

Grosswald	2003	U.S. workforce from 1997 National Study of the Changing Workforce (Families and Work Institute, 1999)	• Parameters of:
			  ○ Mood
			  ○ Energy
			  ○ Time for family as functions of one's job
			• Effect of Negative Work-to-Family Spillover (NWFSp) on:
			  ○ Education level
			  ○ Occupation
			  ○ Children
			  ○ Spouse support
			  ○ Age
			  ○ Household Income
			  ○ Ethnicity

Sumer & Knight	2001	481 employees in mid-western universities in USA	• Work-Family Linkage (Work-Family Linkage Questionnaire (WFLQ) adapted from Kopelman et al. (1983)) • Attachment style (scale used developed by Bartholomew & Horowitz, (1991)) • Job satisfaction (Minnesota Satisfaction Questionnaire developed by Weiss et al., (1967)) • Life satisfaction (Satisfaction With Life Scale (SWLS) developed by Diener, Emmons, Larsen, & Griffin, (1985)) • Home and relationship satisfaction • Demographics
Grzywacz & Marks	2000a	The National Survey of Midlife Development in the United States included 1547 adult employees.	• Spouse affectional support (scale used developed by Schuster, Kessler, & Aseltine, (1990)) • Spouse disagreement (National Survey of Families and Households) • Family effectual support (scale used developed by Schuster et al., (1990)) • Family criticism or burden (scale used developed by Schuster et al., (1990))
Hart	1999	479 police officers deputed in Victoria Police Department, Australia working on all ranks and work sections	• Positive and negative work experiences (Police Daily Hassles Scale and Police Daily Uplifts Scale developed by Hart, Wearing, & Headey, (1993, 1994)) • Positive and negative non work experiences (Non-work Daily Hassles Scale and a Nonwork Daily Uplifts Scale developed by Kanner, Coyne, Schaefer, & Lazarus (1981)) • Job satisfaction (Minnesota Satisfaction Questionnaire developed by Weiss et al., (1967)) • Non-work satisfaction

Kirchmeyer	1993	221 experienced Canadian managers	• Coping Strategies (Hall's 16 strategies developed by Hall, (1972)) • Nonwork Domain Involvement (Job involvement scale developed by Lodahl & Kejnar, (1965)) • Nonwork Domain Satisfaction, Time Commitment (Hours per week) • Positive spillover (scale used developed by Sieber, (1974)) • Negative Spillover (Interdomain conflict developed by Greenhaus & Beutell, (1985))
Compensation Theory			
Singh & Selvarajan	2013	165 employees in a mid-size organization in Mid-western US	• Organizational Diversity Climate (scale used developed by McKay, Avery, & Morris, (2008)) • Employee Intent to Stay (scale used developed by Kim, Price, Mueller, & Watson, (1996)) • Community Diversity Climate (community diversity climate index (CDCI) used developed by Ragins, Gonzalez, & Singh, (2010)) • Self-reported Race Individual racial affiliations • Organization Tenure (In Months)
Liou, Sylvia, & Brunk	1990	1473 adults in USA were surveyed using National Opinion Research Center's General Social Surveys for 1984.	• Life Satisfaction • Social Trust • Social Equity • Institutional Confidence • Governments Handling of National Problems, Social Involvement
Conflict Theory			
Jamaludin, Ibrahim, & Dagang	2018	248 individual between the age group of 21-59 years from 8 different private company in Kuala Terengganu and Kemaman, Malaysia	• Demographics • Work Family Conflict (Work Family Conflict Scale used developed by Carlson et al., (2000)) • Family Satisfaction (scale used developed by Edwards & Rothbard, (1999)) • Job Content (Job Content Questionnaire (JCQ) used developed by Karasek, (1985))
Bell, Rajendran, & Theiler	2012	139 academicians employed in universities Australia wide	• Job stress (Stress in General scale (SIG) developed by Stanton, Balzer, Smith, Parra, & Ironson, (2001)) • Well Being and Ill- Being (Multidimensional Health States Scale – Short Form developed by (Hardie, Kashima, & Pridmore, (2005)) • Work- Life Balance (scales used developed by Hill, Hawkins, Ferris, & Weitzman, (2001)) • Work Life Conflict (Reworked the Work and Family Relations subscale developed by O'Neil, Helms, Gable, David, & Wrightsman, (1986))

Boyar, Maertz, Mosley, & Carr	2008	698 University employees	● Dependent Variables: ○ Work interfering with family (WIF) and family interfering with work (FIW) (scales used developed by Carlson et al., (2000)) ● Antecedent Variables: ○ Work autonomy (scales used developed by Sims, Szilagyi, & Keller, (1976), Thomas & Ganster, (1995) and Cutrona & Russell, (1987)) ○ Work and family demand (Perceived work demand (PWD) and perceived family demand (PFD) evaluated by scales developed by Boyar, Carr, Mosley, & Carson, (2007)) ○ Work/Family Centrality (work centrality scale used developed by Paullay, Alliger, & Stone -Romero, (1994))
Elloy & Smith	2003	347 lawyers from West Australian Law Society and 331 accountants from Institute of Chartered Secretaries, Australia	● Stress (scale used developed by Cohen, Kamarck, & Mermelstein, (1983)) ● Work-family Conflict (scale used developed by Kopelman et al., (1983)) ● Overload, Role Conflict and Role Ambiguity (scale used developed by Rizzo, House, & Lirtzman, (1970)) ● Family Conflict (scale used developed by Kopelman et al., (1983))
Carlson & Frone	2003	534 adult employees with families	● Work-Family Interference (self-developed) ● Psychological Involvement (scale used developed by Kanungo, (1982a)) ● Behavioral Involvement (question based assessment of Work involvement and Family involvement)
Adams & Jex	1999	522 part-time students from the age group of 19-74 years enrolled in 3 mid-sized universities in US	● Work to family conflict & Family to Work conflict (Bidirectional Work-Family Conflict Scale (two items) used developed by Frone et al., (1992b)) ● Job satisfaction (scale adapted from Job Diagnostic Survey developed by Hackman & Oldham, (1975)) ● Health complaints (General Health Questionnaire developed by Goldberg, (1978)).

Grandey & Cropanzano	1999	132 paid faculty from a Land-grant state university campus, USA	● Work role stress - Role conflict and role ambiguity in the workplace (scales used developed by Kopelman et al., (1983)) ● Family role stress (scale used developed by Pleck, Staines, & Lang, (1980)) ● Work to family conflict (scale used developed by Kopelman et al., (1983b)) ● Family to work conflict ● Job distress (scale used developed by House and Rizzo, (1972)) ● Family distress (job satisfaction scale used developed by Hackman & Lawler, (1971)) ● Life distress (scale used developed by Diener et al., (1985)) ● Poor physical health (general health and somatic tension scale developed by House and Rizzo's (1972)) ● Turnover intentions (scale used developed by Cropanzano, James, & Konovsky, (1993)) ● Self-esteem (10-item global measure of self-esteem developed by Rosenberg, Schooler, Schoenbach, & Rosenberg, (1995)) ● Critical change event.
Adams, King, & King	1996	163 full-time workers cum part-time students enrolled in mid-sized comprehensive university in Michigan, USA.	● Work interfering with family (scale used developed by Kopelman et al., (1983)) ● Family interfering with work (scale used developed by Burley, (1989)) ● Job involvement (scale adapted from Kanungo, (1982a)) ● Family involvement (five parallel items developed by Frone et al., (1992a)) ● Job satisfaction (Job Diagnostic Survey developed by Hackman & Oldham, (1975))
Kopelman et al.	1983	Study 1: 494 male alumni from an eastern technological college (13 alumni randomly chosen from each graduating class from 1941 to 1978) Study 2: Spring of 1981 to graduate and undergraduate students from three colleges in United States	● Study 1 ○ Work Conflict (role conflict scale (4-items) used developed by Rizzo et al.,(1970)) ○ Family Conflict (scales used developed by Blumstein & Schwartz, (1978)) ○ Inter-role Conflict (inter-role conflict scale used developed by Pleck et al., (1980)) ○ Satisfaction (General Job Satisfaction scale modified by 3-items) which was part of the Job Diagnostic Survey developed by Hackman & Oldham, (1975)) ● Study 2: (same scales) ○ Work Conflict ○ Family Conflict ○ Inter-role conflict ○ Satisfaction scales

Border and Boundary Theory			
König & Caner de la Guardia	2014	190 Swiss office workers employed in distinct job sectors (construction, hotels, restaurants and credit sectors) in Switzerland	• Personal internet use at work • Private demands • Border strength • Influence (empowerment scale used developed by Clark, (2002)) • Identification with the job (nine-item job involvement scale used developed by Kanungo, (1982a)) • Supervisory support for border-crossing (communication with family about work scale adapted from Clark, (2002)) • Work–Non work balance (scale used developed by Valcour, (2007))
Hecht & Allen	2009	793 Canadian employees from an organization	• Work–nonwork boundary strength (items from appendix of the paper) • Job- identification (ten-item Job Involvement Questionnaire used developed by Kanungo, (1982a)) • Personal life identification and Inter role conflict (WFC and FWC scales used developed by Netemeyer et al. (1996))
Vodanovich, Lambert, Kass, & Piotrowski	2006	95 married employees working below managerial positions in a biotechnology company in southern California, USA	• Work-family conflict (scales used developed by Clark, (2001) and Kopelman et al., (1983)), • Central Participation and Supportive Communication (scales used developed by Carlson et al., (2000)) • Life Satisfaction, Work Satisfaction and Organizational Commitment (scales used: Clark (2001), Hill et al. (2001), Carlsson & Hamrin (2002)) and Life Satisfaction Questionnaire developed by Ironson, Smith, Brannick, Gibson, & Paul, (1989))
Facilitation Theory			
Karimi & Nouri	2009	250 male employees working in two distinct organizations in Iran	• Work-to-Family Influence, Job Demands and Autonomy, Social Support (scales used adapted from Grzywacz & Marks, (2000b)) • Working Hours • Demographic Characteristics
Seery, Corrigall, & Harpel	2008	347 participants including nurses and childcare workers associated with 49 health centers in North-eastern Pennsylvania, USA	• Self-Focused Emotional Labor (measure of emotional labor developed by Kruml & Geddes, (2000)) • Other-Focused Emotional Labour (scale used developed by Seery & Crowley (2000)) • Work–family conflict and Family-work conflict (scale used developed by Carlson et al., (2000)) • Work-to-Family Facilitation/Family-to Work Facilitation (facilitation scale developed by Grzywacz & Marks (2000b)) • Control variables: Children, time at work and residence

Van Steenbergen, Ellemers, & Mooijaart	2007	352 employees from a financial service organization in Netherlands	• Work–family conflict (scale used developed by Carlson et al., (2000)) • Work-family facilitation (38 items scale used developed by Wagena & Geurts, (2000) and Grzywacz & Marks (2000b)) • Work outcomes (items developed using scale developed by Wanous, Reichers, & Hudy (1997); Nagy (2002); Meyer et al. (1993); Williams & Anderson (1991) and Ellemers, de Gilder, & van den Heuvel, (1998)) • Nonwork outcomes: o Home satisfaction - (scale used developed by Quinn & Staines, (1979)) o Relationship commitment (scale used developed by Rusbult, (1980)) o Home performance (scale used developed by Williams & Anderson, (1991)) o Stress outcomes (a. Emotional exhaustion measured using scale developed by (Schaufeli & Van Dierendonck, (2000) and b. Depressive complaints measured using CES-D developed by Kohout, Berkman, Evans, & Cornoni-Huntley, (1993)).
Hill	2005	1,314 telephonic interviews of employed adults in 1997 in USA	• Work/Family/Individual characteristics-Stressors • Work/Family/Individual characteristic-Resources and support • WF conflict and facilitation • Work/Family/Individual outcomes
Voydanoff	2004	2,507 employed respondents from the 1995 National Survey of Midlife Development in the United States	• Work-to-family conflict and Facilitation • Work and community demands • Work and community resources • Demographic characteristics

Conclusion

The main aim of the study is to assist and provide a comprehensive literature to future researchers in the field of 'work-life balance'

Even though the theories mentioned do not include all the possible scenarios yet the distinct measures used in the studies across various boards do help in concluding a coherence in usage of these measures.

With the emergence of new aspects of technology in day to day lives, fresh perspectives in terms of evaluating the effects of technology and related aids on the work-life balance can be studied and explored. Furthermore, various studies and associated measures are focused on gender but in today's time the landscape of family setup in terms of childcare and eldercare has changed drastically which leaves a scope to cover gender oriented studies using these measures.

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IMPACT OF COVID-19 ON INDIAN SECTORAL INDICES: CASE OF BSE MANUFACTURING & FINANCIAL INDEX

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Abstract

Outbreak of Covid has caused serious damage to economic and financial health of affected countries. India is among the worst-hit countries by Covid-19. In order to do the damage, control the government of India and policy makers have formulated and implemented various restrictive policies to lower the rising cases and deaths due to Covid-19. These restrictions proved to be effective in curtailing the rate of rising cases and deaths but adversely affected the economic health of India and Stock Market being a significant reflector of the health of economy also reflected major numbers in red and a period of extreme volatility and risk for current and prospective investors. The purpose of this study is to empirically analyze the impact of Covid-19 on Sectoral Indices of Manufacturing Sector and Financial Sector of India. This study is based on data from January 30, 2018 to January 31, 2022. TGARCH (1,1) model is identified and estimated to study the conditional volatility in sectoral markets. Sectoral indices of Bombay Stock Exchange have been analyzed in this study. It was found that S&P BSE Manufacturing Sectoral Index and S&P BSE Finance Sectoral Index experienced higher risk after the outbreak of Covid-19 in India. They respond more strongly to negative news as compared to positive news. Covid-19 has not significantly affected the returns in these sectors, but has been identified as an underlying cause to rise in volatility in Finance Sectoral Index.

Keywords : Stock Market , Volatility, Covid-19, BSE, Risk, Return.

Introduction

Outbreak of Covid-19 in the different parts of the world has affected social, economic, financial and political stability of the countries of the world. Covid-19 caused serious risk to health and life of people all over the world. In order to reduce the risk to lives of the citizens, government and policy makers imposed various restrictive measures to reduce the rate of rising cases and deaths. Portfolio of corrective measures included travel restrictions across the border of states and countries, quarantine for travelers traveling from other countries and imposing lockdown in different parts of the countries. Due to these corrective actions taken by policy makers, countries experienced slowdown and losses in economic activities. This led to job loss and salary cuts across various verticals of jobs in different industries. This forced the consumers to cut down on expenses and demands to only basic and necessity goods. The fear of being part of a crashing health care and economic system pushed countries at developed, developing economies to panic stage.

(Bhatia & Gupta, 2020) Stock market volatility is formed by news about company, industry or country made available to public (Coronavirus Lockdown: Sensex Logs Biggest Loss Ever, Ends 3,934 Points Lower; Nifty down 1,110 Points - Business Today, n.d.). BSE and NSE market nosedived with the sharpest single day crash in the history of Indian market, on the date of announcement of lockdown in different parts of the country on March 23, 2020. BSE Sensex crashed with over 13.15 %

and NSE crashed with over 12.98 % , all the stocks of benchmark index closed in red , with a really bad shape in breadth of the market with only 232 stocks ending in green and over 2037 stocks ending in red (Impact of COVID-19 on the Manufacturing Sector in India - Supply Chain Asia, n.d.). Manufacturing sector contributes approximately sixteen to seventeen percent to the growth GDP and gives employment opportunity to over twenty percent workforce in India. All the major reflectors of health of manufacturing sector got adversely affected during this period. With workforce labors migrating to their villages from different parts of the country, disruption of supply chain and shortage of raw material, liquidity crunch in the hands of manufacturers, weaker demands due to reduction in income in the hands of buyers, underutilization of production capacity due to limited demands of produces, the manufacturing sector companies were seeing situation going out of control of their hands. Imposition of lockdown and restrictions on international movement across countries disrupted both demand and supply side of the manufacturing sector. Limited moment of economic and human resources caused a significant slowdown in supply side due to reduced need of human capital , people lost their jobs and were left with limited income to meet their expenses for necessary needs. Size of manufacturing sector reduced to half of it in the period from March 2020 to March 2021. Index of Industry production (IIP) reflected a negative growth rate of 9.6 percent in the year 2020-21.

Companies involved in financial services have experienced a really tough time due to various restrictive and corrective measures taken by policy makers. Banking companies contribute to Financial Services industry. They experienced high risk period of mounting pressure of NPA's and reduction in quality of assets on their existing numbers of NPA's already existing before the outbreak of Covid-19. In 2020-21 there was a significant surge in Gross NPA ratio in Indian Banking companies. To provide relief to borrowers from mounting pressure of debt service and repayment burden, RBI announced moratorium for period from March 1, 2020 to August 2020 but this added to the worries of the financial intermediaries. Another significant contributor of Financial Services Industry has also seen a lot of volatility in terms of changing perception towards different categories of Insurance policies. All these things added up to the pressure on Financial Sectoral Index, and it reflected significantly in initial 2020.

Manufacturing and Financial Sector form integral part of the economic system , manufacturing sector contribute significantly to the GDP growth of our country and Financial Sector being the significant provider to economic and financial health of the country have been selected for the purpose of this study.

S&P BSE Manufacturing Index and S&P BSE Finance Index have been selected for the purpose of this study because the Manufacturing Index covers diverse set of companies from different types of significant industries. And S&P BSE Finance Index covers the companies from Banking, Insurance and other significant allied financial services.

The flow of paper is divided into Review of Literature, Data Collection & Methodology, Findings and Conclusion.

Review of Literature

(Bora & Basistha, 2021)This study empirically analyze the impact of Covid-19 on Stock market in India. It was found that volatility is significant in Bombay Stock Exchange and insignificant in National

Stock Exchange. Average returns in pre Covid-19 were higher in comparison to returns during covid-19 in the market. Standard Deviations during Covid-19 were higher during Covid-19 in comparison to pre Covid-19 era. Stock market experienced a change in trend during period of transition from before Covid-19 to Covid-19 period . The prices fell sharply in initial phase of 2020, and gradually started forming an upward trend.

(Bhatia & Gupta, 2020) In this study the authors have empirically analyzed and compare the effect of Global Financial Crisis and Covid-19 on volatility in Indian Banking Sector Stocks by focusing on sectoral Indices of Banking Companies. Using symmetric as well as asymmetric GARCH models it was found that NSE Banking Sector Index was most volatile during Sub-prime crisis as per symmetric GARCH model, but leverage effect was found to be significant for all three indices NBI, PSUBI and PSBI but during Covid-19 leverage effect was only significant for PSUBI. PSBI and NBI can provide good opportunity for investors to hedge against risk. Leverage effect means that negative news creates more volatility in market in comparison to positive news. The impact of global financial crisis on these indices were more prolonged in comparison to Covid-19.

(Sadiq et al., n.d.) This study focuses on the identifying the behavior of ASEAN markets during March 21, 2020 to April 31,2020 . Cases of Covid-19 reported and number of deaths have been used a measure of Covid-19. It was found that Health Care Stocks , Consumer Services Stocks were worst hit by the volatility in the market. Covid did not leave any positive impact on the stock markets of ASEAN member countries, and Thailand and Indonesia were found to be most affected by the Covid crisis. Negative impact of Stock market returns of Covid-19 was observed and a positive relation of Covid 19 and Stock Market volatilities was observed.

(Baek et al., 2020) This study focused on the impact of Covid-19 on US stock market and it was found that overall risk increased across 36 industries of US stock market. It was found that systematic risk increased for defensive stocks and decreased for aggressive stocks. Based on regression model of selected economic and Covid reflector factors (cases reported and cases recovered), it was found that Covid had more significant impact on volatility of stock market. Also it was found that US market responds to positive as well as negative news but impact of negative news is more strong on volatility in US market.

(Uddin et al., 2021) In this study of 34 developed and emerging markets, it was found that impact of Covid-19 on stock markets varied according to the development level of the markets. Stock markets across the world have exhibited varying degrees of volatility following the recent COVID-19 pandemic. Economic health based reflectors of each country including intensity of capitalism, economic resilience, monetary policy rate , financial development, level of corporate governance and quality of health system can help a protect a country against possible volatility.

(Bakry et al., 2022) Based on study of impact of news concerning total number of cases and deaths due to Covd-19, announcement of Pfizer-BioNTech and corrective measures taken by the government against Covid-19 on selected developed and developing countries, it was found that all these factors had more influence on the volatility of developing markets as compared to developed markets .It was found that increase in cases and death rate and government corrective actions had a positive impact on stock market volatility in emerging markets. Recovery rate of Covid affected cases helped in reducing the volatility in emerging markets. Also, announcement of launch of Pfizer-BioNtech medicine had increased volatility in both the category of markets.

(Fernandez-Perez et al., 2021) In a study of impact of social factors of a country on extent of volatility caused in the stock market due to pandemic, it was found that the countries with more uncertainty and low individualism had experienced more significant fall in stock market and volatility in first three weeks of declaration of Covid-cases in the country in the stock market. Abnormal returns are used as the basis of computing the volatility.

(Haldar & Sethi, 2021) In a study of 10 worst hit markets due to Covid-19, it was determined that, there is a significant increase in negative returns and volatility in stock market during December 2019-May2020 Media coverage regarding Covid-19 has significant influence on stock market volatility in these markets.

(Albulescu, 2021) In a study of impact of Covid 19 in US market volatility, it was found that official announcement of cases and deaths reported at global and at US level, it was found that announcement of deaths reported at global level has more impact on volatility in US market. New cases reported at U.S.A and global level surged the volatility in the US market. Covid-19 emerged as a significant contributor to the overall financial risk in US market.

(Rakshit & Neog, 2021) In a comparative study of selected developing countries during Covid and financial crisis, it was found that the markets are found to be more volatile during Covid in compression to the global financial crisis period.

(Khanthavit, 2021) In a study of a time period before Covid and after outbreak of Covid pre Covid returns got replaced by post Covid returns and they are negatively autocorrelated with volatility caused due to Covid in Stock markets. The volatility in markets varied according to cases of deaths and new cases.

(Bal & Mohanty, 2021) In a study of relationship among Covid-19 cases and Indian stock market volatilities using Granger Causality Test, it is determined that impact of Covid-19 volatility in Indian Stock market is for short run period.

Data Collection & Methodology

Data Collection : Secondary method is used to collect the data for this study. Daily prices of Sectoral Index data of S&P BSE India Manufacturing Index and S&P BSE Finance Sector Index have been collected from official website of BSE. Data for the duration from January 30 , 2020 – January 31, 2022 has been collected. This time frame is divided in two periods, before and after confirmation of first case of Covid-19 in India. In India first case of Covid was confirmed on 30th January 2020 in Kerala. This has been used a break point in data to bifurcate pre covid and post outbreak of Covid-19 in India.

Daily closing price is utilized of BSE sectoral Indices for analyzing volatilities of stock market. Natural logs of daily prices of study period have been calculated.

Log Normal Distribution: This study is conducted on log normal returns series determined on the basis of daily closing index values of sectoral indices using following equation.

$$Rt = \text{Log } Pt - \text{Log} Pt\text{-}1.$$

Rt represents day wise returns, Pt represent current day price, Pt-1 represents previous day price and Log means lognormal returns in the equation 1.

Volatility modelling is used in this research paper. Volatility models are developed on the basis of

log return series for both sectoral indices. All the conditional requirements have been analysed and checked to identify the mean equation and variance equation under Asymmetric GARCH model. Existence of ARCH effect in mean equation is mandatory to use GARCH model. ARCH LM test is used to determine ARCH effect.

Graphical Representation: Line graph of the return series of S&P Manufacturing Sector Index and S&P BSE Finance Sector Index is prepared to capture the impact of market positions on returns in these markets. Results of graph are given in Graph 1 and 2 for Manufacturing and Finance Sectoral Indices respectively.

Descriptive Statistics: Mean, skewness, standard deviation, kurtosis, and Jarque-bera test have been calculated for complete period of the study, and two sub periods i.e. pre covid and the period post outbreak of covid have been analysed for Manufacturing and Finance Sectoral Indices. Result of Descriptive statistics are reported in (**Table 1**).

Table 1: Statistic Measure

S.no	Statistic Measure	Meaning
1	Mean	Measures the average value of the distribution.
2	Standard Deviation	It helps in finding the distance between the series and its mean value.
3	Kurtosis	It is a measure of normality of distribution . It represents the peakiness or flatness of the series.
4	Skewness	It helps in measuring asymmetry in the series.
5	Jarque-bera test	It helps in deterring normality of the series based upon its coefficient value and probability value.

Unit Root Test: Presence of Unit root test has been tested using Augmented Dickey–Fuller test. Stationarity of series is studied because inclusion of non-stationary series may lead to formation of a spurious regression and adversely affect the findings of the study. Results of Unit root test is reported in **Table 2**

ARCH effect: The basic condition to apply the GARCH model. This has been confirmed with ARCH LM test. Results of ARCH LM test are reported in **Table 3**.

TGARCH (1,1): Threshold GARCH Model has been used in this study it helps in studying the asymmetry effect. The asymmetry in terms of positive and negative shocks . The limitation of symmetric standard GARCH model is that it ignores the difference between positive and negative shock. By using TGARCH model the asymmetry can be identified.

Dummy variables to capture effect of COVID-19

To capture the impact of covid-19 on conditional return and volatility a dummy variable has been incorporated in conditional mean and variance equation of TGARCH (1 ,1) model. A dummy variable for capturing presence and absence of covid 19 shall be inserted. The Dummy value shall be 1 if data is for the post covid outbreak period and 0 if data for period before outbreak of Covid-19

Mean Equation of Conditional Return is as follows :

$$Rt = \beta 0 + \delta(Pt - 1) + \varphi D_1 + \varepsilon t \quad \ldots\ldots\ldots\ldots 1$$

Conditional variance equation for TGARCH(1,1) model is as follows:

$$\sigma^2 = \beta 0 + \theta_1 \sigma^2 - 1 + \beta_1 \varepsilon t^2 - 1 + \gamma_1 I_{t-1} \varepsilon t^2 - 1 + \alpha_1 D_1 \ldots. \quad \ldots\ldots\ldots\ldots 2$$

In variance equation if εt-1 > 0 then it reflects negative shock and if et-1< 0 then it reflects positive shock. In order to distinguish between positive and negative shocks εt-1 has been squared to capture negative impact. If γ_1 if is positive and less than 0 then it reflects then it implies leverage effect of difference in impact of positive and negative news on the volatility in the series . If γ_1 >0 then negative news will have more effect then positive news .Coefficient of positive shock is β_1 and for negative shocks the impact will be β_1+γ_1 .

But if γ_1 is zero then it implies that there is symmetry in the model, and symmetric GARCH(1,1) model can also be used.

A dummy variable has been incorporated in conditional return and volatility equation. Log return series for 30/1/2018-29/1/2020 have been assigned a dummy value of 0 reflecting period of absence of Covid-19 in India. For period from 30/1/2020 – 31/1/2022 has been given dummy value of 1, reflecting the period post outbreak of Covid-19 in India.

If coefficients of dummy variable in mean equation and volatility equation are found statically significant then it will reflect a significant impact of Covid19 on return and volatility in the sectoral markets.

Descriptive Statistics

Descriptive Statistics of S&P BSE Manufacturing Index- Results of mean and standard deviation imply that there is rise in the risk and return in Manufacturing sector companies in period post outbreak of Covid-19 as compared to post Covid outbreak period. Results of Jarque-Bera test reveals that the series is not normally distributed under all three conditions. Results of skewness reflect that the returns are negatively skewed for post Covid-19 outbreak period and for complete period, it implies that the majority of returns are below the average returns in these periods.

Descriptive Statistics of S&P BSE Finance Index : Results of descriptive Statistics reflect that there is rise in risk and return in the post Covid-19 outbreak as compared to period before outbreak of Covid-19. Results of skewness reflect that the majority of returns earned in complete period and post Covid period are below average returns in these periods. Results of Jarque-Bera test confirm non normal distribution of the series.

Comparing the results of Manufacturing sector and Financial Sector, it can be said that investors in Financial Sector have earned higher returns at higher risk in comparison to investors in Manufacturing sector.

Table 2: Descriptive Statistics

	Full Sample Period		Before Covid		After Covid	
	S&PBSE MI	S&PBSE FI	S&PBSE MI	S&PBSE FI	S&PBSE MI	S&PBSE FI
Mean	.000317	0.000296	-4.50E-05	0.000213	.000673	0.000378
SD	.012740	0.016662	0.010153	0.010948	.014858	0.020826
Skewness	-1.150772	-1.470403	0.359578	0.613443	-1.59342	-1.594140
Kurtosis	22.82292	20.23195	8.516651	7.688122	22.87608	15.94337
Jarque-Bera Statistics	16444.21	12618.26	634.4877	481.4167	8425.327	3694.594
P Value	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000

Graphical Representation of Daily Lognormal Returns

Results in **figure 1 and 2** reflect that returns of S&P BSE Manufacturing Sector and S&P BSE Finance Sector for the total period of study, and it can be observed that markets show significant changes and rise in volatility during the early period of the year 2020.

Figure 1: Returns of S&P BSE Manufacturing Sector Index

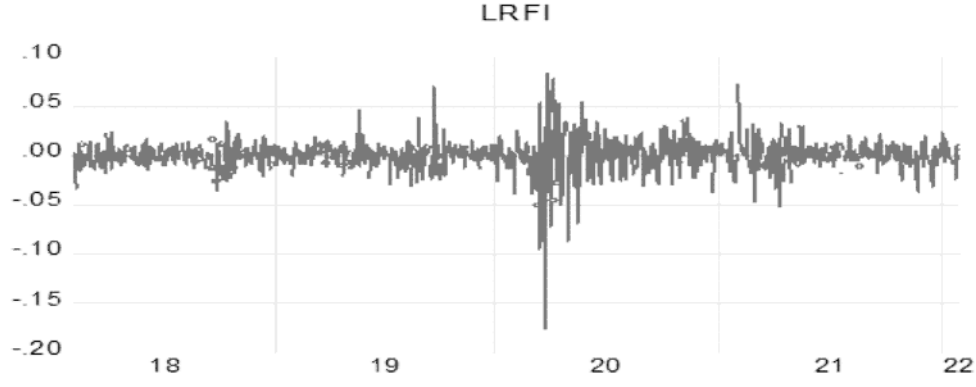

Figure 2 : Returns of S&P BSE Finance Sector Index

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Unit Root test- Augmented Dickey-Fuller Test

Augmented dickey-fuller test is used to check stationarity of log return series of S&P BSE Manufacturing Sector Index and S&P BSE Finance Sectoral Index. ADF values of both the series are statically significant. Based on the results , null hypothesis of presence of unit root in series is rejected , confirming that both the series are stationary.

Table 3 : Unit Root Test- Augmented Dickey-Fuller Test

Series	S&P BSE Manufacturing sectorial index	S&PBSE Finance Sector Index
ADF Value	-8.817673**	-7.910288**

** Results significant at 5% level of significance

Test of ARCH effect - ARCH LM Test

ARCH-LM test confirm that the values of Observed R square are statistically significant at 5% level of significance. Null hypothesis of absence of ARCH effect can be rejected.

There is ARCH effect in S&P BSE Manufacturing Sectoral Index and S&P BSE Finance Sector Index. GARCH model can be used to analyse the volatility in these markets since there is presence of ARCH effect in these markets.

Table 4 : ARCH LM Test

Series	S&P BSE Manufacturing sectoral index	S&PBSE Finance Sector Index
Obs.R-Squared	38.25189**	9.931287**

Co efficient of conditional Mean Equation

The results of conditional mean equation reflects that the conditional returns of BSE Manufacturing Sectoral Index and Finance Sectoral Index are significantly affected by previous day price (δ) but there is no significant effect of (φ)Covid-19 on returns of these markets.

Table 5
Regression Model of Mean Returns Equation

Variable	Coefficient		Z Statistics		P value	
	S&PBSE MI	S&PBSE FI	S&PBSE MI	S&PBSE FI	S&PBSE MI	S&PBSE FI
$\beta 0$	-0.000227	0.000265	-0.548519	0.591883	0.5833	0.5539
δ	0.069770	0.093115	2.066361	2.898488	0.0388**	0.0037**
φ	0.000743	0.000147	1.137184	0.199950	0.2555	0.8415

** Results significant at 5% level of significance.

Co efficient of conditional Variance equation

The results of conditional variance equation as per TGARCH (1,1) model equation are reflected in **Table 6**. It shows the value of γ_1 is greater than 0 and there is leverage effect i.e. impact of negative shock is greater than the impact of positive shocks on Manufacturing Sector Index & Finance Sectoral Index.

The α_1 is the coeffcient of dummy variable of Covid-19 , is positive but insignificant for Manufacturing Sector Index , confirming positive but insignificant impact on volatility in this sector .For Financial sector Index , it can be observed that the impact of covid-19 is significant , i.e. it has increased the volatility in Financial Sectoral Index in post Covid-19 outbreak period.

The coefficient of GARCH term θ_1 is positive and significant and insignificant for ARCH term. If we add the coefficient of ARCH and GARCH term it can be said that Finance Sectoral Index is more volatile in comparison to Manufacturing Sectoral Index. GARCH effect confirms that there is impact of previous day news has impact on the current volatility and there is volatility in the market reflected in terms of smaller shocks followed by smaller shocks and bigger shocks followed by bigger shocks.

$\beta 1\ is\ positive\ and\ > 0\ but\ less\ then\ 1$ and $\theta_1 is\ positive\ and\ > 0\ but\ less\ then\ 1$ and $\theta_1 + \beta 1 < 1$, therefore stability condition is satisfied for the model.

Table 6
T-GARCH(1,1) Model

	S&PBSE MI			S&PBSE FI		
Variable	**Coefficient**	**Z -statistics**	**P value**	**Coefficient**	**Z -statistics**	**P value**
β_0	5.28E-06	5.410174	0.0000	4.15E-06	3.460961	0.0005
θ_1	.851497	63.42347	0.0000*	0.867747	48.30545	0.0000*
β_1	.005084	.430448	0.6669	0.018787	1.547543	0.1217
α_1	5.69E-07	.670090	0.5028	3.51E-06	2.479567	0.0132**
γ_1	.199099	8.492648	0.0000*	0.171644	6.858274	0.0000*

*Results significant at 1% level of significance.
** Results significant at 5 percent level of significance.

Conclusion

In this study, investigation about effect of Covid-19 on the Sectoral Indices of S&P BSE Manufacturing Index and S&P BSE Finance Sectoral Index for the period from January 30 2018 to January 31 2022. T GARCH(1,1) model has been used to check the impact of Covid-19 on returns and volatility in returns . Based on results of descriptive Statistics it can be observed that there is increase in overall risk of these markets in post covid-19 period as compared to pre-covid 19 period. Average returns in these markets have also increased in post covid-19 outbreak period. Based on TGARCH(1,1) model an asymmetry is also observed i.e. BSE Manufacturing Index and Finance Sectoral Index experience more volatility from negative news as compared to positive news in the market. Volatility in S&P BSE Finance Sector Index is significantly affected by the outbreak of Covid-19.

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ANALYZING THE POTENTIAL OF SOCIAL MEDIA FOR HERITAGE HOTELS OF INDIA

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Abstract

The internet's expansion has constantly supported social media in society from the late 1990s and early 2000s. Several hundred million active users utilize various social media platforms, dedicating time to communicating and finding information within the cyber community. For both hoteliers and visitors, the advent of social media has offered up new opportunities. It has increased marketing efforts for hotels. It has also aided travelers in getting insight into the area and arranging their stay.

Such prevalence and linkage between these two variables, i.e., social media and travelers, proposes the study in the field of heritage hotels and social media. For this purpose, the data was collected from the Indian travelers with a functional sample size of 571.To test the hypothesis, the structural equation model was used and Chi-square test was used to determine the model's fit. To conclude, the present research paper proposes the analysis of social media to understand the traveler's behaviors and suggest the marketing tactics to heritage hotels.

Keywords: Social Media, Online Engagement, Hospitality, Heritage Hotels.

Introduction and Review of Literature

Any traveler while surfing through the social media sites gets across with many photos and videos having beautiful locations and exotic scenes which arose the desire of being there and intends them to look into the details of the location. As soon as the location gets final and the traveling plan comes into the picture there comes the need of booking the hotel and resorts for stay. From here the search for hotels and resorts starts and social media plays its role. Hence, to continue social media in today's times hasn't spared any sector and hotels are no exception to it. Hotels have already adopted a new and innovative way to showcase themselves through social media. It is emerging as an important tool for travelers by helping them to see new locations, engage directly with a hotel, enhancing their satisfaction and building trust. Social media also entice travelers by offering extending market deals, giving them passive incentives to like, share and comment. Besides this, the use of influencer marketing and blogger engagements has also been impactful. The use of social media is rising day by day in the hotel industry and it's creating more loyalty, attaching new customers and enhancing visibility. Various platforms such as Facebook, Snapchat, LinkedIn, YouTube and Twitter have been effectively employed for marketing of services by the hospitality industry. Social media platforms facilitate online functionality and monitoring perspectives allowing hotel operators to improvise their services and meet customer's expectation.

(Verma, M. and Verma, K. 2018), in their research paper titled “Social Media a Promotional Tool: Hotel Industry” explore the role of social media by hotels as well as customer opinions on the use and advantages of social media. Hotels that utilize social media to attract new clients, hold existing clients, and upgrade their online presence are beginning to experience positive benefits. The primary motivation for hotels to engage in social media marketing is to improve their image and promote their properties. Social media channels help hotels in Customer Relationship Management (CRM) and in learning more about customer preferences and behavior. According to the authors, social media cannot directly assist in sales, but it can assist in brand awareness and exposure to outside people, resulting in positive long-term results.

(Lee, W., and Chhabra, D. 2015), in their study "Heritage hotels and historic lodging: Perspectives on

experiential marketing and sustainable culture" offer vital and remaking techniques for the sustainable use of historical accommodations. Heritage sustainable tourism, according to the authors, offers host communities with genuine economic benefits while also fostering communal and cultural participation with community welfare. Heritage hotels become a broad field of research.

The influence of social media engagement by hotels on prospective booking and income generation is investigated by (Healy, T. G., and Wilson, A. 2015).The authors achieve this by first examining top hotel executives' perceptions on the return on investment (ROI) by social media activity, then mining hotel booking data for determining the scope of social media involvement by visitor with a hotel before & after a reservation is done, and finally experimenting with advertising via social media to determine its effect on hotel guest booking and income creation. According to the research, social media engagement and advertising have a positive impact on hotel reservations and revenue generation. Social media participation also improves customer service and brand awareness, however it is unclear if it influences purchase behavior. According to researchers, when followers are picked-out with promotional offers over social media, they are more likely to buy, share, and interact.

(Shirase, R. 2014), finds in his article "The Effect of Social Networking Sites on Hotel Sector in Pune Region," that the hotel industry may advertise itself on social networking sites by engaging consumers and clients in discussion and then recognising their requirements. The hotel sector may connect with customers on social media before, during, and after their visit. SNS establishes a genuine connection between businesses and their consumers, sparking a purchase-intensity trend and providing a platform for innovative advertising to be employed successfully for the hotel industry's growth. With the usage of online social platforms, the hotels may achieve competitive edge by lowering advertising costs, increasing awareness, capturing a larger market, transacting worldwide, improving customer service quality, and acquiring new consumers.

The article "An Empirical Study on Use of Social Media in the Hotel Industry in China: A Study of Customers' Preferences and Attitudes" by (Wang, R. and Chen, T. 2014) focused on the choice and view point of Chinese passengers, as well as the association between social media utilization (based on WeChat and SinaWeibo) and hotel options in the industry. The study's findings show that associated hotels and network ticketing companies favor to utilize social media to captivate visitors and likely customers. The highest three factors influencing hotel selection being pricing (71.84 percent), location (68.16 percent), and online rating (33.06 percent).

(Enyioko, N. C. and Nwokah, N. G. 2018)**,** examined the impact of social network marketing on organizational efficiency and highlighted that enhancing brand image and creating awareness were the two important objectives accomplished by it. The authors further concluded that strategic use of Facebook, Twitter and blog significantly impacted organizational effectiveness.

(Momany and Alshboul, 2016) further highlighted the strategic relevance of social media marketing for hotels in creating additional promotional opportunities and generating brand awareness among customers. (Tom Dieck, Jung and Moorhouse 2018), had described the usage of social networking sites in luxury hotels and ended up concluding that the social networking sites have emerged as a prominent marketing tool in business promotion resulting in wider reach and expansion. They further elaborated that Facebook and Snapchat among social media platforms have emerged as an important source of communication for helping customers from varied geographical zones of the world to stay connected. As per a study by (Mangold & Faulds 2009) marketing through social media allows companies to communicate with their prospects and also facilitates flow of information among the customer themselves as well.

Heritage Hotel Selection and Social Media Potency: Its Direct Effect

As a result of social media, satisfaction in context of travelling has increased. Travelers mostly share positive

information about themselves on social media. This positive information is frequently followed by an honest answer, which further strengthens the positive feedback. As a result, the level of confidence rises. Furthermore, positive information posted on social media also leads to increase in traveler's confidence and morale, which results in impromptu booking and decision-making. The decision to book heritage hotels appears to eliminate the coherent behavior of travelers'. Increasing self-esteem and flaunting privilege among others are all the common factors that contribute to fast decisions.

In fact, heritage hotels demonstrate lavish and royal spending which symbolizes travelers' prestige. Booking a stay at a heritage hotel is more of a exhibiting. Furthermore, it has been hypothesized that increased use of social networking sites leads to a positive impact on booking of a heritage hotel. Believing this, the hypothesis of the study is framed as –

H_1: The increased usage of social media has a favorable impact on the booking of a heritage hotel.

Methodology

To test the hypothesis, the study collected a sample from Indian travelers. Travelers who had at least stayed once in any of the heritage hotel of India were considered under study. For data collection purposive sampling was used with a functional sample size of 571. Data was collected through online Google forms over a period of six months. For testing the hypothesis, the structural equation model was used and Chi-square test was used to check the model's fit. Squared multiple correlations and correlations among variables were evaluated to assess the reliability and validity of research variables and items.

Variables, Data Analysis and Assessment

For the study, two main variables were considered which included Social Media Potency and Booking of Heritage Hotel. Both the variables have been analyzed with the help of six-point Likert scale as highlighted in Table 1.

Table 1: Representing the Research Constructs and Variables

Constructs	Question	Variables	Source
Social media Potency (SMP)	Rate your intensity of using the following social media channels? (Where 1 is "Not At All Active" and 6 being "Very Active")	SMP 1: Social media platforms (e.g. Facebook and Instagram) SMP 2: Micro-blogging sites (e.g. Twitter) SMP 3: Online photo-sharing platforms (e.g. Instagram, and Pinterest) SMP 4: Sited for video sharing (e.g. YouTube)	Adapted from Gilbert and Bush (2002) and Ellison, et al. (Gonzales, A. L., & Hancock, J. T., 2011)
Booking of Heritage Hotel(BHH)	Prior to booking the heritage hotel for a stay what factors were considered? (Where 1 being "Strongly Disagree" and 6 being "Strongly Agree")	BHH 1: It's important to know what my colleague thinks of a heritage hotel I'm considering to book. BHH 2: It's important to know which kind of individuals are booking the heritage hotel I'm thinking about. BHH 3: Knowing what other people think of individuals who book certain heritage hotels, as I do, is important. BHH 4: Knowing which heritage hotel to book is crucial for making a good first impression.	The scale is developed based on the concept derived from Chung and Fisher (2001).

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To gauge the reliability and validity of research variables and items, squared multiple correlations and correlations among the variables were calculated. Analysis and calculation unfold the considerable interconnection between the variables. The following data, supplement the validity of the research variables-

- Mostly, the Correlation among the variables is higher than 0.70.
- Most of the research variable has r^2 higher than 0.60.
- In addition, variables are also valid. As the factor loadings of the research variables range from 0.69 to 0.91.

To analyze and inspect the reliability of constructs, variables, and scales, composite reliability (cr) and Cronbach's Alpha (α)were used. Cronbach's Alpha (α) and Composite reliability (cr) are both more than 0.70, indicating that the study variables and construct are trustworthy and valid.

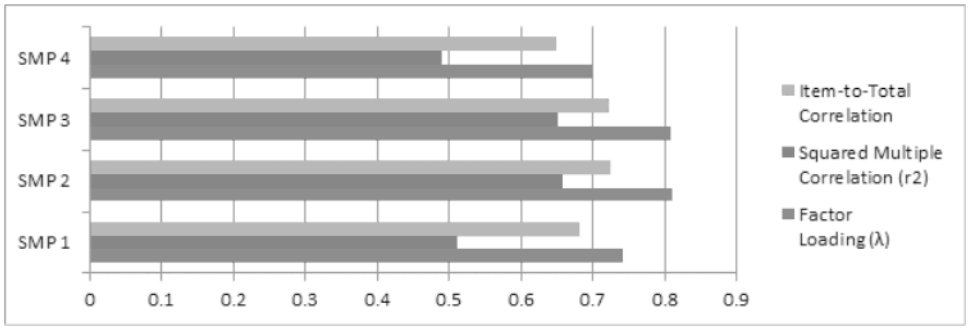

Figure 1: Delineating the Analysis of Social Media Potency (SMP)

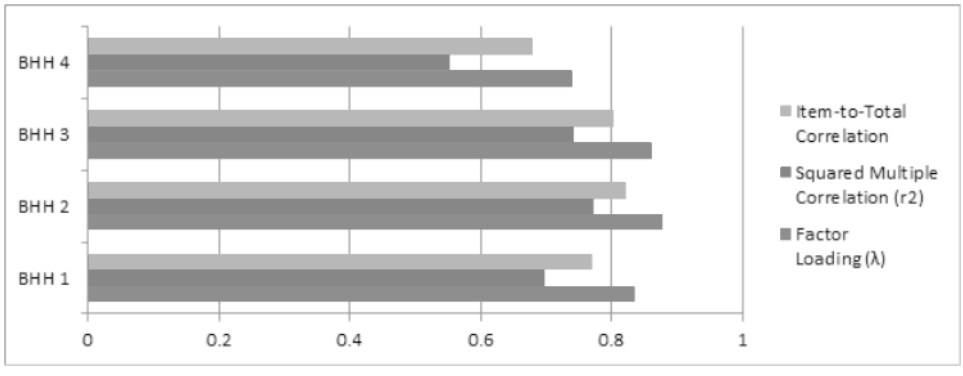

Figure 2: Delineating the Analysis of Booking of Heritage Hotel (BHH)

Table 2. Delineating the analysis of reliability and validity of research constructs

Construct	Composite Reliability (cr)	Cronbach's Alpha (á)	Average Variance Extracted (ave)	Standard Error (se)	SMP	BHH
					Square root of the average variance extracted (ave)	
Social media Potency (SMP)	.721	.853	.393	.029	.627	
Booking of Heritage Hotel(BHH)	.823	.897	.539	.028		.734

Table 2, shows the data analysis in regards to reliability and validity of research constructs. It is followed in accordance to usual approach provided by Fornell and Larcker (1981) and Bagozzi and Warshaw (1990). The square roots of average variance retrieved for all constructs were then determined. It was also discovered to be larger than the relevant correlation with other constructs, indicating that it was sufficient. Furthermore, each construct demonstrates viability because the correlation is smaller than 1 when the standard errors are taken into account. Since the study's constructs and variables have been proved to be trustworthy, valid, and suitable, the research has progressed to the next stage of testing the hypothesis.

Findings and Discussion

The structural equation model was employed to test the hypothesis. The model fit was tested using the Chi-square test, as proposed by Yi and Bagozzi (2012). The model's X^2 is 354.17(d.f. =71), which is significant at p.01. However, the literature on the structural equation model suggests that chi-square should not have been used alone to assess model fit. Sample size sensitivity is the explanation behind this. Given the study's enormous sample size, seeing much colossal X^2 becomes impossible. As a result, other important indices such as TLI (NNFI), RMSEA, and CFI, with values of 0.972, 0.58, and 0.978, have been considered (R. P., Bagozzi& Yi, Y., 2012). The structural model bestows an appropriate and a good fit for the data, as the TLI and CFI are higher than 0.97 and RMSEA is lesser than 0.60. The data analysis expresses powerful results and supplements both the hypothesis. **Figure 3** depicts positive structural coefficients with a significant p<.01and having the relative standard errors indicated in parentheses. The potency and increase use of social media positively and significantly impact the booking of heritage hotels having β = .384 and p <.01). Thus, the data validates H_1.

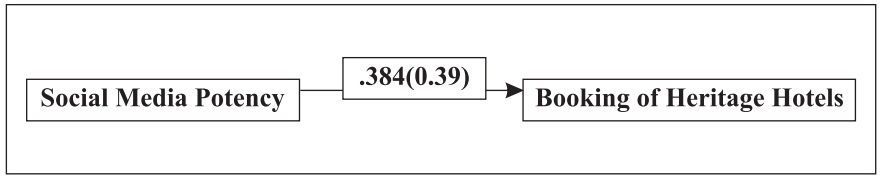

Figure 3: Structural Coefficients of Hypothesis

Table 3: Delineating the direct, indirect and comprehensive impact (Standardized Structural Coefficients)

	SMP ˜ BHH
Direct Impact	.301
Indirect Impact	.196
Comprehensive Impact	.497

Table 3 shows the values of structural coefficients, and the data analysis depicts the direct impact, indirect impact and comprehensive impact of social media potency on booking of heritage hotels. Direct impact of social media on booking of heritage hotels is found to be .301 and its indirect impact is .196. Taking about social media compressive impact on booking of heritage hotel, it is found to be .497. Agreeing to divination, the results of the study factually prove that the potency of social media is so powerful that it impacts and influences the booking of a heritage hotel. Research also stipulates that increased active involvement on social media by travelers leads to an increased chance of booking heritage hotels by stimulating the sense of prestige.

Conclusion and Suggestions

The research paper has explicitly scrutinized and has examined the phenomenon of social media impact on decision-making of travelers while booking heritage hotels in India. For this purpose, rigorous and empirical analysis of data in regards to the two research constructs of the study; social media use and potency and booking of heritage hotels has been carried out. The results of data analysis conclude that social media networking has affected traveler's choices tremendously. India is a country that offers an exemplary depiction of developing economies and its travelers have latterly escalated the usage of the internet and social media networking. This growth and advancement give a wide scope to heritage hotels for implementing marketing strategies to attract travelers. The research paper authenticates and elongates both the literature on social media networking and the behavior of travelers by studying how social media has impacted the decision-making of travelers. Thus, it also supplements the academic contribution. Facebook, Instagram, Youtube and other social media network channels offer travelers to post and present their views and opinion. And often, to exhibit their prestige among their friends, travelers render and showcase the luxury and positive details. The replies on the post by community members and friends lead to the enhancement of positive information, which thus usher the prestige and self-esteem leading to the constructive advantage of social media. In comparison to the distant know members, the close members in the social media network are also proven crucial in the decision of booking of a heritage hotel. Posting the positive information makes other travelers actively involved and makes them rely on the information. Based on which they make the booking decision. As a result, the study supports the usage of social network strategy.

The findings of the data analysis show both primary and secondary effects of a social media site on heritage hotel bookings, which help hoteliers build modern and digital marketing strategies.

Future Research

The further study may be elucidated in researching other relevant factors such as the expectation of travelers in booking the heritage hotels, the propensity to over-spending and over-utilization of credit and the researches focusing on the deeper insight of traveler's practices in cyber & virtual environment. Besides this, comparative studies of various models from different studies in national and international contexts can also pave a way for further development of advanced theories.

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ROLE OF SOCIAL ENTREPRENEUR IN GENERATING EMPLOYMENT OPPORTUNITY: A STUDY OF SOCIAL ENTREPRENEURS OF RAJASTHAN

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Abstract

What business entrepreneurs are to the economy, social entrepreneurs are to the social change? They are the driven, creative individuals who question the status quo, exploit new opportunities refuse to give up and remake the world for the better (David Borntein). Most of what we know as "social service" in the early days was aid to help people in need. Gradually we saw the emergence of relief and welfare organisations. In fact these groups were some of the first NGOs. However, many of these organisations have moved much further today and involved in what is referred to as "development". In recent years, the definition of philanthropy has evolved and got a new meaning. Its application can be seen in numerous innovative projects introduced by social entrepreneurs. It holds a significant position in uplifting quality of life of society. They are a new breed of people who strive to bring social change by their out-of-box thinking. The paper seeks to explore the concept and meaning of social entrepreneurs. It further illustrates various social entrepreneurs of Rajasthan and their contribution in bringing change to society and examines their role in generating employment opportunities to the rural people of Rajasthan. The research methodology which is applied during the research is descriptive in nature. Secondary data used in this study is collected through existing available literature related to entrepreneurship and social entrepreneurship. Therefore, when we speak of developing a community it is the process or effort of building people or a group on a local level, to transform their capacities to handle their social relationships, their basic economy, improve their surroundings and in fact overall strive for a better quality of life.

Key Words : Social entrepreneurs, Role of Social Entrepreneurs, Social Entrepreneurs of India.

Introduction

Social entrepreneurs are people who know what the word "BELIEVE" means. They see social problems as roadblocks to society and are committed enough to provide a sustainable solution with their innovative efforts and techniques. They are the local change makers who are willing to take risk and creates a difference by providing solutions that are sustainable, understandable, user-friendly and ethical for the people of society. An enterprise which exists for doing 'social good' along with generating profits is what social entrepreneurship is all about. NGOs are non-profit making and purely service-oriented organisations committed to the development and welfare of the community. They set examples by their different working approach and motivate others to channelize their efforts to take new leaps. Social entrepreneurs are visionary, community driven and realists concerned with the practical execution of their vision above all.

Objective of the Study

To study the concept and meaning of Social Entrepreneur.

To examine the role of social entrepreneurs in generating employment opportunities to the rural people of Rajasthan.

To study the challenges faced by a social entrepreneur while pursuing their goals.

To study the possible solutions for overcoming the challenges faced by social entrepreneur.

Research Methodology

The methodology which is used in this study is descriptive in nature. The research is based on the secondary data. The existing available literature related to entrepreneurship and social entrepreneurship is included in the study.

Review of Literature

- A report title "Social Entrepreneurship and Social Sustainability: An analytical study" (2014) prepared by Namita Rajput and Parul Chopra states that Sustainable Development is a process whereby development is undertaken in such a way that interests of stakeholders of nature, and diverse social groups including future generations are protected and preserved. The paper seeks to throw light on how Social Enterprises amalgamated with sustainability initiative has brought about concrete results befitting both our society as well as nature.
- (J. Gregory Dees 1998) in his article "The meaning of Social Entrepreneur" has given the more elaborate definition of social entrepreneurship. According to him, social entrepreneurs play the role of change agent in the social sector. First by adopting a mission to create and sustain social value, second by recognizing and relentlessly pursuing opportunities to serve the mission, third by engaging in a process of continuous innovation, adaptation and learning, fourth by acting boldly without being limited by resources currently in hand, fifth by exhibiting heightened accountability to the constituencies served and for the outcomes created.
- (Dr. Hemant kumar P. Bulsara, Dr. Shailesh Gandhi, Dr. Jyoti Chandwani 2015) in their research paper titled "Social Entrepreneurship in India: An Exploratory Study" discuss about the growing trends of social entrepreneur in India and the new initiatives taken by various social entrepreneurs including Arvind hospital, AMUL, SEWA, SELCO and found that they are ready to share their expertise to the society for the benefit of social development. This paper has given an insight into the meaning of social entrepreneurs in India and the possible reasons for a transition towards social entrepreneur and way forward.
- (Dr. Sarada Chengalvala and Dr. Satyanarayana Rentala 2017) in their research paper titled "Intentions Towards Social Entrepreneurship among University students in India" attempt to understand the intentions of university students regarding social entrepreneur as a future career of choice. Additionally, this research also attempts to understand the challenges perceived to undertake social entrepreneur as a career choice among university students in India. A sample of 150 university students across the country was included in the research. Findings of the study indicate that having an interest in social entrepreneur is the most important factor determines the intentions together with proactive personality, entrepreneur attitude, entrepreneur education and perceived behaviour control. It is recommended social entrepreneur should work with business school, higher education institutes in developing curriculum that create social entrepreneur habits. So that high quality manager can be produced.
- (Dr. P.V Raveendra 2017) in his research paper titled "Social Entrepreneur: An Alternative Approach for Indian Economy" attempts to identify the differences between entrepreneur and

social entrepreneur. It also aims at understanding the different components of social entrepreneur in Indian society. Entrepreneurship creates employment and supply the goods to the market but social entrepreneurs creates employment as well as it give boost to demand side also.The research is based on the secondary data. It was concluded that Government of India should take steps to inculcate social entrepreneur among Indians. The future scope of this study states that in wider area, an ambitious research could be conducted to understand the scope of social entrepreneur, which would be a resource for government to formulate plans and policies to mainstream good practices in order to develop necessary support system to encourage communtiy based social entrepreneur.

- (Smita Gupta and Nishith Dubey 2017) "Role of social entrepreneurs as social change agents: an insight" highlighted the importance of social enterprises as they are the local change makers who try to improve the system with their innovative ideas and approaches and create better solution for society. In the current scenario, Social entrepreneurship sector is undergoing a sea change and social enterprises need to play a dominant role in the same. Social enterprises are equal participants in bringing about direct impact in the society and thus acquiring equilibrium in the society in terms of socio economic development.
- (Satar Shahid Mir 2016) in his paper titled "A Policy Framework for Social Entrepreneurship in India" seeks to explore the policy areas concerning the moderately contested field of social entrepreneurship. The paper responds to the recent social entrepreneurship policy development of India and attempts to address the need for policy development for this sector. The paper out rightly highlights the need to fill the policy vaccum in social entrepreneurship context and discusses the positive implications of policy measures at local and state level.
- (Shekhar Upadhyay, Priyanka Rawal, Alka Awasthi 2017) "Uplifting society by providing innovative solutions- A study of social entrepreneurs in India" present a detailed study on variety of topics related to social entrepreneurs, including the conceptual framework and process of social entrepreneurs. It explains the concepts like social needs and social innovations from entrepreneur's point of view. Research methodology which is applied during the research study is descriptive in nature. Findings of the study are Social enterprise can change the face of society in India. If the government and other stakeholders can work out the challenges of social entrepreneurs effectively, then social entrepreneurs is the most important tool which has the full capacity to change the very face of society in India.
- (Momina Bushra and Dr. Kushendra Mishra 2014) in their research paper titled "Role of Entrepreneurship in transiting India from an emerging economy to a developed economy" seeks to identify the risk perceptions of Indian youth who form the major proportion of Indian population. This paper also attempts to give reasons why India lags behind in promoting entrepreneurship. Conclusion from the literature are drawn suggesting India has no dearth of entrepreneurship talent but there is a need to promote, motivate and train the young entrepreneurs which is difficult without peristent government support. There is a need to aware people about the various schemes of government that are formed to promote entrepreneurship because government have ample of schemes related to subsidies and funding.
- (Jose Mamman 2014) in his research paper titled "Application of Research Methodology in Social Entrepreneurship" discussed various researches being undertaken in the field of social

entrepreneurship; methodologies used in those papers and explored the current state of empirical research on social entrepreneur.This confirms the stage of infancy of social entrepreneur research as a field of scientific inquiry and highlighted the potential areas for future theory building and theory testing. An undeveloped domain that has the potential to understand social entrepreneur from an impact factor or citation based perspectives is the future scope of study.

- (Dr. Partap Singh 2012) in his research paper titled "Social entrepreneurship: A growing trend in Indian economy" attempts to shed light on analytical, critical and synthetic examination/role of social entrepreneurship in India. This paper empasized the role of social entrepreneur as he is a person who is the founder, cofounder or a chief functioning of a social enterprise. It also signified the role of NPO,NGO, foundation, government, individual to promote fund and act as an advisory committee or agent for them. Social Entrepreneur is expected to be the next big thing to influence India as the country juggles to achieve a balance between growing GDP growth, ensuring inclusive growth and attempting to address issues ranging from education, energy, efficienct to climate change.
- (Mahesh U. Daru 2013) in his research paper titled "Social Entrepreneurship- A way to bring social change" discussed the emerging trends of social entrepreneurship in developing countries like India and its future prospects and challenges. This paper shows lights on how development of social entrepreneurship can solve the problem of society which is ignored by commercial and government enterprises. Social entrepreneurs are people who realize where there is an opportunity to satisfy some and unmet need that the state welfare system will not or cannot meet and who gather together the necessary resource and use this "to make a difference". Example of Bangladesh Rural Advancement Committee , SEWA, Aravind eye hospital, Green Belt Movement, The Grameen Bank were illustrated. More empirical studies are needed to map the opportunity space for social entrepreneurs.

Role of Social Entrepreneur in Generating Employment Opportunity to the Rural People of Rajasthan

Jaipur Rugs

Nand Kishore Chaudhary founded Jaipur Rugs in 1978. In hand knotted rugs, it is one of the largest manufacturer in India. The company is headquartered in Jaipur and has an operation span in 6 states and 600 villages with more than 20+ branches. It has a distribution set up for over 40 countries including Atlanta, United States and 40,000 artisans are working independently all across the rural sections of Rajasthan.

In the initial years, he started business of carpet with just 2 looms and 9 artisans and gradually expanded its business operations in the tribal region of Gujarat. In 1999, Chaudhary launched its firm "Jaipur Carpets" which was converted to "Jaipur Rugs Pvt Ltd " in 2006.

Founded in 1978, the company has revolutionized the carpet industry by creating an entirely new business model - working directly with artisans and uplifting their lives and communities as a result. Since then, they have grown to become a global, award-winning brand, sharing a unique point of view through their range of home décor products.

N K Chaudhary believes in the enormous potential of artisans of India and to showcase their potential

to the world, he decided to form a company. Along with it, the mission was to improve the quality of life of artisans together with upgrading weaving technique. They not only produce luxurious, beautiful carpets but also helps artisans and marginal section of society in generating employment opportunities in a secure environment and thus earn a living. It presents a variety of over 40 technical variants of rugs woven with the finest yarns.

Jaipur Rugs Foundation

In 2004 **Jaipur Rugs Foundation** was registered under the Rajasthan Public Trust Act. It is the service arm of Jaipur Rugs Group, which stays connected to the company's grassroots. The aim was to integrate and channelise the efforts of rural people by educating them and training them to become independent base artisans and also giving them a market for their products. The foundation helps the potential weaver to learn about weaving, manually operating looms and the process of hand-knotted carpets. Now the skilled artisans are home-based independent weavers who earn a living by providing services to rug company. Thus the overall purpose of this foundation is to enlighten, empower the marginalized communities especially women living in the underserved and un-served areas by equipping and developing their skills and capacities and rendering them with sustainable livelihood options.

The overall upliftment of quality of life is done through two intertwined verticals: 'social development' and 'entrepreneurship development'. In 'social development' vertical, the foundation links them with literacy, education, artisan cards and health care facilities. Their motive is to create awareness through new interventions and linkages. On the other hand motive of 'entrepreneurship development' vertical is to provide economic stability to the artisans through sustainable livelihood support and skill development. Existence of both creates a win-win situation and motivates the artisans in developing their skills.

The participation of more and more women artisans was acknowledged because of the sense of pride, recognition and personal worth was attached to it. By providing such platform it nurtured their financial and emotional stability and created a model of 'Inclusive Growth'.

Jaipur Foot

Bhagwan Mahaveer Viklang Sahayata Samiti (BMVSS) is a dream project of Mr. D.R Mehta. It is world's largest organisation for the disabledwith the rehabilitation of over 1.55 million number of beneficiaries from all across the world. BMVSS has also provided crutches, hand-paddles tricycle, calipers , artificial limbs , wheel chair and other aids and appliances to polio patients through its camps and outreach programme. According to Time magazine, it is one of the best invention of the world for 2009.

BMVSS was registered on March 29, 1975 established as a society under the Rajasthan Societies Registration Act . It has its headquarters in Jaipur. With a strong base of 23 branches, Jaipur Foot is working Pan-India starting from Srinagar to Chennai and extending over Ahemdabad to Guwahati. Other than that it has its other limb fitment centre in metropolitan cities such as Varanasi, Hyderabad, Bengaluru, Mumbai, Delhi, Patna.

Since inception, BMVSS regularly holds numerous on-site field camps outside its centers in different parts of the country to help patients who havephysical difficulty in traveling to the centers for free of cost. Doctors and technicians travel with equipment and materials, sometimes with a mobile van, to

these camps. 50 such camps are held every year. They provide on-the-spot assistance in fitment and fabrication, delivery of limbs and other aids and appliances. BMVSS has been given Special Consultative Status with the Economic & Social Council of the United Nations Organization (UNO).

Mehta's focus on combining social service with science led to a memorandum of understanding between Stanford University and the BMVSS, resulting in the development of Jaipur Knee.

The vision of Bhagwan Mahaveer Viklang Sahayata Samiti (BMVSS) is to enable the economic and physical rehabilitation of the amputee, to empower them with ways to sustain their dignity and regain their lost mobility and once again become productive and confident members of society.

The mission of Bhagwan Mahaveer Viklang Sahayata Samiti (BMVSS) is to provide free assistance and appliances i.e prosthetics, calipers and other physical aids to as many disabled people as possible for free of cost through its centres, outreach programmes and rehabilitation camps, both in India and abroad. Imparting employment schemes and vocational training as economic support to young amputees and assistance for self-employment for sustainedlivelihood (on selective basis) contributing to **anti-alleviation programme**. Undertake collaborative or in-house research and development for improving the existing quality of calipers, and limbs and developing newer ones with the improvised version of the same and with lower cost.

Piramal Foundation

Piramal Foundation the social arm of Piramal Group creates and develops unconventional solutions to problems that are roadblocks to India's development. It has introduced programs in different sectors namely Education, Healthcare and clean drinking water. It has succeeded to provide these services with the support and partnership from state and central government spanning across 21 Indian states and have impacted million of lives till date.

Each social initiative nurtured by Piramal Foundation, addresses one of the three focus areas :

- **Healthcare: Piramal Swasthya**
- **Education: Piramal Foundation for Education Leadership**
- **Clean Drinking Water: Piramal Sarvajal**

The foundation believes in power of knowledge and through appropriate actions, impactful exercises together with collaborative effort of like-minded people it brings positive change in society. Its main motive is to deliver projects that are impactful and sustainable in long run.

Along with the Strategic Development Goals, the focus of this organisation is also on empowering women, improving maternal health, universal primary education, improving access to safe drinking water and reducing child mortality rates.

Moreover, in collaboration with government, international organisations like World Diabetes Foundation, Michael & Susan Dell Foundation and Harvard Graduate School of Education and other technology partners it has developed programs for the social upliftment of society. It has recently partnered with NITI Aayog to transform 25 aspirational districts across 7 states in India.The projects are implemented through Piramal Swasthya, Piramal Sarvajal and Piramal Foundation for Education Leadership.

Piramal Sarvajal came into existence in 2008 with a mission to create and design unconventional

solutions to problems that people of under served areas face on day-to-day basis. The aim is to provide innovative solutions to problem of safe drinking water with easy accessibility. Incorporating business practices along with latest technologies in its market-based business model ; the motive is to provide sustainable solution to both rural and urban population of India.

Piramal Sarvajal, provides safe drinking water through customized decentralized drinking water solutions at selected urban and rural locations. This is achieved through installation of a state-of-the-art community level purification plant for delivery of safe drinking water at affordable prices to the beneficiaries.

The project is operated in partnership with a local entrepreneur or the local Panchayat/ Community Based Organization; thereby creating sustainable livelihood opportunities within the chosen community.

Piramal Swasthya is seeded by Piramal Foundation . The mission of this organisation is to make healthcare affordable, accessible and available to each section of the society especially the marginalised people.

Through effective use of innovation and technology, Piramal Swasthya tries to bridge the gap between primary healthcare availability and easy accessibiltiy to the remote areas of Rajasthan.

The Piramal Foundation for Education Leadership (PFEL), an initiative of the Piramal Foundation, has been designing, executing and imparting leadership training programs for youth, academicians and education administrators by mutually improving processes and deploying technology and integrating tools through various programmes. In 2008 PFEL it has 4 crore programmes and in 2017 it has expanded to 6 crore.

The aim of this organisation is to build expression, learning, pride and joy along with improving technology in the government education system. It has signed long term MoUs in collaboration with central and state government.

Barefoot College

Barefoot college also known as Social Work and Research Centre (SWRC) was founded in 1972 by Bunker Roy. It is a voluntary organisation registered under Friends of Tilonia Inc. It is working in the field of women empowerment, skill development, safe drinking water, education and health by establishing solar power which provides the marginalised rural people sustainable living.

The people who teach in this college are professionals from all walks of life. They give lessons in writing, reading and through practical application to the youth of Tilonia village. The student are especially the adults, girls, women and children who are either illiterate or drop outs.

The organisation has followed flexibility in operations by setting up nights schools. This allows the students to learn and train at night as most of them works during the day to support their family. Along with students, the organisation has created a system that trains the trainer to bring skill development to villages. Despite of illiteracy, it is good to see large number of girls in the night schools. In 2008, on an average 20 children presence were seen in each night school. In total 150 night schools were operating. The campus spreads across 8 acres and also has self-built rainwater harvestingdesign by the students.

In Time magazine (Vol. 175 No. 18, May 2010) Bunker Roy was acknowledged as one of the 100

most influential people for an inevitable contribution made by him to the society. Greg Mortenson has mentioned that grass-roots social entrepreneurship has trained more than 3 million people for jobs. The approach followed by them is so rudimentary that they have dirty floors and no chairs so that poor students feel at ease while learning.

From providing water solutions by setting up water pumps near villages to empowering rural people of society by training adults, women and men to learn how solar power operates Bunker Roy has been named in one of the 50 environmentalists playing a prominent role in saving the planet.

Kamala Devi, one of the student of Barefoot College became the first female solar engineer trained by college's program. Later in 2012 she bacame the head of the solar unit at Kadampura.

Bunker Roy is a true example of social entrepreneur as he has trained and uplift the quality of life of masses through its determination and hard work. He has made service- learning an important part of the process and to teach the basic skills and know-how to the community especially women to learn and do things which are normally dominated by men. The idea is to make the community "self-sufficient" without depending on any other outside source. And to make the practice sustainable the organisation has joined hands with professionals who are doctors, social workers, post graduates, chartered accountants who are dedicated to do their bit by providing teaching module to students.

Challenges Faced by Social Entrepreneur

- **Lack of Planning:** A well thought out plan is the pillar of any enterprise. Failing in which, can pose an uncertain situation in front of entrepreneur. A proper business model with strong infrastructure should be formed in advance which can guide in the long run.
- **Need of Dedicated Individuals:** It is one of the most unique challenge faced by entrepreneurs. When people join any organisation they seek monetary benefits and perks it brings together with it. In social entrepreneurship, the case is different. The main motive of existence of such organisation is for social benefit of society not personal gains. Finding dedicated team which happens to share mutual understanding is a tough task.
- **Availability of Adequate Funds:** The next challenge which is faced by social entrepreneur is lack of availability of funds. Despite of offering creative solutions to problems their inability to arrange funds from financial institutions is still a dire task to perform. Lack of confidence and personal interest proves to be a challenge for the new breed of people.
- **Under Utilisation of Communication Portals:** People who shares same thinking and interest are already well versed with the services provided by such institutions but in larger picture, the untapped population who wants to buy the product and services but are not actively involved in the cause and belief should be the next target of these philanthropists. There is a need to go beyond digital advertising for promotion.

Recommendations for Overcoming Challenges

- **Strive to Build Strong Organisation Base:** Availability of funds in the long run and carrying out social entrepreneurial activities in a financially efficient manner are crucial for meeting organisation's objectives. For organisations who are working for uplifting the poor sections of society needs to ensure that their efforts and support does not end due to funds shortage. Level of social impact, meeting performance targets on time, sound administration and operation

management of enterprise are some of the indicators that determines organisation's effectiveness and through which more and more investors and incubators can be pitched.

- **Social Entrepreneur in Management Curriculum:** To have a clear understanding of the roles, responsibilities and opportunities lying ahead for social entrepreneurs and to sensitize scholars towards society it should be included as a separate topic in the curriculum of management studies.
- **Tapping the Local Market:** For making people buy your product; it is important that they should know your product. Efforts should be made to reach out to the untapped market and create awareness by forming alliance with other social entrepreneurs.
- **Government Support :** Government should collaborate with social entrepreneurs while designing schemes and projects for under privileged people of society and should incorporate the inputs given by them in their programme.

Findings of the Study

- It was observed that the contribution made by the social enterprises has escalated and enhanced the quality of life, education level and status of healthcare facility of the weaker section of society in India.
- The challenges faced by social entrepreneurs were found quite unique and it is not wrong to say that the pace of growth is low and this sector is still at an exploration stage.
- Although it has been noticed that government is taking an active role in promoting the efforts made by social entrepreneurs by supporting them through various schemes and relaxation policies.

Conclusion

Social entrepreneurship has the potential to change the scenario of society by providing unique and sustainable solutions to social problems which were not addressed earlier. Sumita Ghose's Rangsutra, Anita Ahuja's Conserve India, Harish Hande's SELCO, Saloni Malhotra's DesiCrew, Dhruv Lakre's Mirakle Couriers and many more personalities are setting milestones and examples in the history of India who believes in the theory of left no stone unturned. The products and services offered by social entrepreneurs promises to offer maximum social impact and caters to the societal requirements along with reasonable profits for the firm. For developing country like India the future prospect of social entrepreneurship is favourable as there still exist social problems that are required to be solved and answered through new techniques and innovation. If government and other financial institutions supports the philanthropic team with right pace and in right direction then the social entrepreneurship has the full potential to provide creative answers to the difficult questions.

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RANDOM FOREST MODEL FOR CLASSIFICATION OF RAISINS USING MORPHOLOGICAL FEATURES

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Abstract

The Random Forest model is utilised to differentiate Raisins into Kecimen and Besni. Chorionic Villus Sampling (CVS) was used to collect photos of the Turkish raisin cultivars Kecimen and Besni. In all, 900 raisin kernels were used, with 450 pieces of each type. Following various stages of pre-processing, seven morphological features were extracted from these pictures. These features were classified using three artificial intelligence systems. On the basis of the features, the dispersion of both raisin kinds were analysed and graphed. The subsequent model is built through using Random Forest Machine Learning approach. As a result, the categorization accuracy achieved is 90.44 percent, classification error: 9.56 percent, weighted mean recall: 90.44 percent, weights: 1, 1, weighted mean precision: 90.91 percent, weights: 1, 1, absolute error: 0.194 +/- 0.196, correlation: 0.814.

Keywords: Random Forest, Classification, Raisin Classification, Machine Learning, Prediction.

Introduction

Machine learning (ML) refers to a range of computational models and statistical approaches that employ computerized training and machine intelligence concepts to allow computers to understand a structure or predict the outcome without having to be specifically configured. Random forests, also known as random alternative forests, popular technique for categorization, prediction, and some special challenges that works with the aid of constructing an oversized style of call timber for the duration of coaching. For classification problems, the random forest output is that the elegance chosen through the majority of timber. The not unusual mean forecast of the various timbers is introduced for class and regression troubles. Random selection forests seize up on choice timber propensity to overfit their schooling set. Random forests beat out decision trees in popular, although its accuracy is worse than those of gradient increased bushes. But, the features of the data may also want a touching on their overall performance. The random wooded area, due to the fact the name shows comprises a huge set of exclusive name bushes that job alongside as associate in nursing ensemble. Every character tree in the random wooded area produces a type version, and therefore the class with some of the most votes turns into the prediction of model **(Refer Figure 1)**.

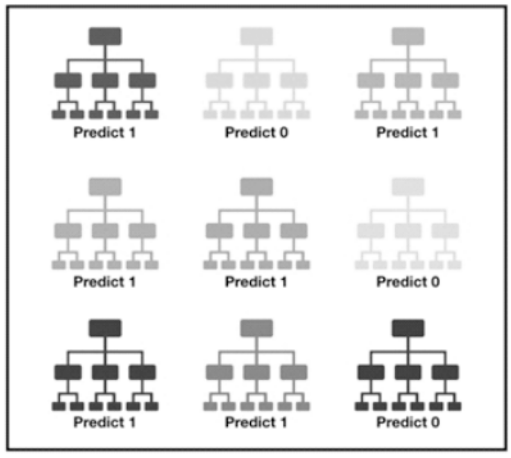

Figure 1 : Random Forest Prediction

Raisins are a dense supply of carbs as well as a healthy snack, as they include antioxidants, potassium, fibre, and iron. Turkey is among the leading grape-producing nations on the planet. Table grapes account for 30% of all grapes produced in Turkey, while dried grapes account for 37%, wine for 3%, and other goods account for 30%. Traditional methods for analysing and judging food quality have a wide range of uses. These, however, can be expensive and time consuming. Furthermore, mortal processes derived from conventional techniques might be unpredictable and ineffective, and physical factors such as weariness, as well as individuals' mental moods, can have an impact on the work's output. These unpleasant scenarios and issues are the driving forces behind the development of alternative ways for evaluating the fundamental characteristics of items like raisins promptly and correctly. One of these alternate techniques is the use of a machine apparition system. It is essential to retrieve characteristics from photos and use them to test and measure the effectiveness of various items using machine apparition.

Performance assessments were conducted after models were developed using Linear Regression (LR), Multi-Layer Perception(MLP), and Support Vector Machine (SVM) machine learning approaches. The accuracy of the classification was 85.22 percent with LR, 86.33 percent with MLP, and 86.44 percent with SVM, the study's greatest classification accuracy. Using raisin photographs and morphological features extracted from these photos, performance measurements of three different machine learning methods were done in this work. As a performance metric, statistical data from the confusion matrix produced from the classification performance were employed. When it comes to overall prediction performance, the SVM method has accuracy score of 86.44.(CINAR, 2020)

Each algorithm may be superior at tackling a particular issue. Decision Tree (different topologies including both classification and regression problems), SVM (for binary classification problems, or supervised learning), Logistic Regression (supervised), Neural Network (NN) (for unsubstantiated and semi-supervised learnings), and Nave Bayes are the most used algorithms (supervised). Complex (or black box) algorithms like SVM and NN are also seen to perform better in many circumstances, although they are difficult to explain. Complex models also have a longer computation time (Escobar, 2018). Random Forest (RF) is a useful tool for assisting in the building of

these maps. The use of radio frequency (RF) for picture categorization is a suitable and extremely reliable approach of classification. (Matthew, 2014).When contrasted to other well-known machine learning approaches such as K-Nearest Neighbor (K-NN) and SVM algorithms, the RF-based methodology gives superior accuracy (Hossam, 2014).

Dataset

First, raisin sample photos were acquired and processed utilising various image processing techniques in this investigation. The photos were transformed to grayscale images before being transformed to input image. On binary images, the imcomplement function converts black regions to white and white areas to black. Noise was removed from the photos later. The resulting pictures were then subjected to several morphological feature inference techniques in the next step.

CVS was used to capture images of the Kecimen and Besni raisin cultivars produced in Turkey. 900 raisin kernels were utilised in total, with 450 pieces from each kind. Seven morphological traits were retrieved from these photos after various phases of pre-processing. Three artificial intelligence algorithms were used to classify these characteristics.

Data Set Characteristics:	Multivariate	Number of Instances:	900
Attribute Characteristics:	Integer, Real	Number of Attributes:	8

Figure 2: Data Set Information

The different types of attributes used in this dataset are as follows: Area (The number of pixels within the raisin's limits is returned.), Perimeter (It calculates the space between the raisin's edges and the pixels surrounding it to determine the environment.), MajorAxisLength (The length of the principal axis, that would be the widest line on the raisin, is given.), MinorAxisLength (The length of the tiny axis, which is the shortest line on the raisin, is given.), Eccentricity (It is an indicator of the ellipse's eccentricity, that has the same phases as raisins.), ConvexArea (The input image in the narrowest slightly curved shell of the raisin-shaped area.), Extent (Gives the proportion of the raisin's area to the entire pixels in the enclosing box) and Class (Kecimen and Besni raisin) **(Refer Figure 2)**

Proposed Model

In this study, Random Forest model is proposed to classify Raisins into Kecimen and Besni class. This model comprises various phases. Each phase has its own task to be performed. In this research, RapidMiner tool is used to classify the type of raisins. The below figure gives detailed view of the proposed model: **(Refer Figure 3)**

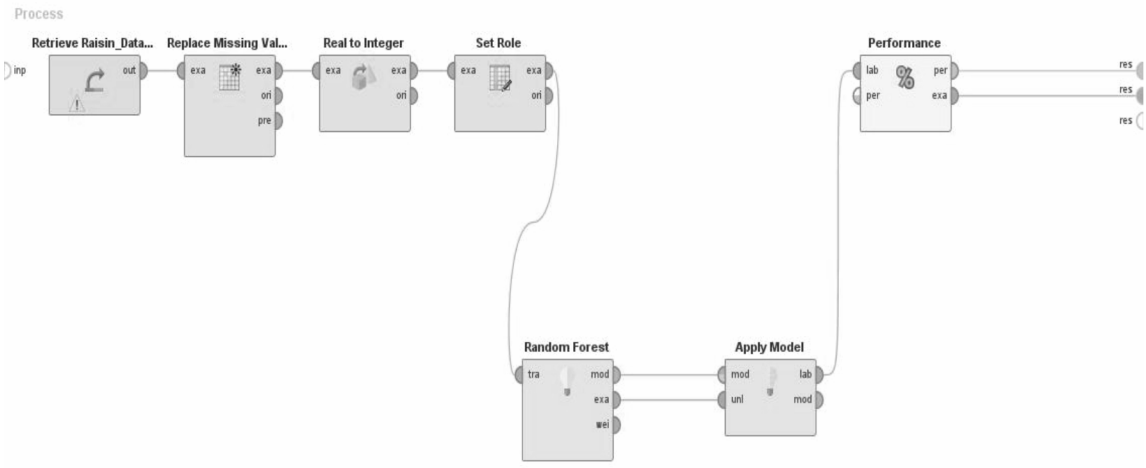

Figure 3 : Random Forest Model to Classify Raisins

The Figure 3 comprises following phases:

(I) Data Collection: The dataset has been collected from UCI Machine Learning Repository about Raisins (Raisin_Dataset.csv). This dataset contains different attributes about raisins like: Area, Perimeter, MajorAxisLength, MinorAxisLength, ConvexArea, Extent and Class. The dataset is multivariate, having 900 numbers of instances and 8 attributes. These attributes are of real and integer.

(ii) Data Preprocessing: The preprocessing phase consists of tasks like: replacing missing values and converting the type of data from real to integer. The data preprocessing phase is important for effective classification of the raisins. Data contains some missing values like the cell in sheet is blank which needs to solved by different technique to improve the classification process.

(iii) Setting Role: In classification, one of the attribute called special attribute, which indicates that this attribute is to predict the type of raisin. The special attribute is known as Label. So, to define an attribute as Label, it is needed to set the role of the attribute and make it as label. Here in this study, 'Class' attribute is working as a special attribute, thus it is called as the Label in the classification process.

(iv) Training and Testing: For training and testing of the model, Radom Forest machine learning technique is used. Random forests, also known as random choice forests, are really an ensemble learning approach for categorization, prediction, and some other challenges that works by building a large number of decision trees during training. For classification problems, the random forest output is the class chosen by the majority of trees. The average mean forecast of the different trees is delivered for classification and regression problems. Random decision forests compensate for decision trees' propensity to overfit their training set.

In fashionable, random forests surpass desire trees, but their accuracy is lower than that of gradient augmented trees. The excellent of the records, alternatively, may have an influence on

their performance as the call implies, the random forest is made up of a huge wide variety of awesome choice timber that perform collectively like an outfit. every tree inside this random woodland generates a class algorithm, and the category with the highest votes becomes our model's forecast. The schooling dataset containing 70% of the information and checking out dataset incorporates 30% of the records.

(v) Performance: After testing of the model, its performance needs to be analyzed. Different types of performance vectors have been used to analyze the performance of the model. These performance vectors are: Accuracy, Classification error, Weighted mean precision, weighted mean recall, absolute error, correlation and cross-entropy. The value of these performance vectors indicates the overall performance of the model.

Experimental Results

The proposed model as described gives various experimental results as in form of performance vectors, histograms, confusion matrix and many more. High Grade Technique was used to capture images of the Kecimen and Besni raisin cultivars produced in Turkey. 900 raisin grains were utilised in total, with 450 pieces from each kind. Seven morphological traits were retrieved from these photos after various phases of pre-processing. Three artificial intelligence algorithms were used to classify these characteristics. On the characteristics, both raisin varieties' distributions were analysed, and these probabilities were graphed. The Random Forest Machine Learning approach is used to construct the later model. As a consequence, the accuracy of categorization reached is 90.44 percent, classification_error: 9.56%, weighted_mean_recall: 90.44%, weights: 1, 1, weighted_mean_precision: 90.91%, weights: 1, 1, absolute_error: 0.194 +/- 0.196, correlation: 0.814, cross-entropy: 0.383.

The whole experiment is done in RapidMiner Tool. RapidMiner Studio is a powerful data mining tool capable of handling everything from information retrieval via dedicated to making and modeling operations.

Figure 3 depicts the attributes, their type, missing values, and classification details in statistical form.

Name	Type	Missing	Statistics		
Label **Class**	Polynominal	0	Least Kecimen (450)	Most Besni (450)	Values Besni (450), Kecimen (450)
Prediction **prediction(Class)**	Polynominal	0	Least Besni (402)	Most Kecimen (498)	Values Kecimen (498), Besni (402)
Confidence_Kecimen **confidence(Kecimen)**	Real	0	Min 0.027	Max 0.941	Average 0.502
Confidence_Besni **confidence(Besni)**	Real	0	Min 0.059	Max 0.973	Average 0.498
MajorAxisLength	Integer	0	Min 225	Max 997	Average 430.434
MinorAxisLength	Integer	0	Min 143	Max 492	Average 254.001
Eccentricity	Integer	0	Min 0	Max 0	Average 0
Extent	Integer	0	Min 0	Max 0	Average 0
Perimeter	Integer	0	Min 619	Max 2697	Average 1165.427
Area	Integer	0	Min 25387	Max 235047	Average 87804.128
ConvexArea	Integer	0	Min 26139	Max 278217	Average 91186.090

Figure 4: Dataset Statistical Report

The set of rules gave experimental outcomes inside the shape of Histogram. **Figure 5** indicates the confusion matrix of the version:

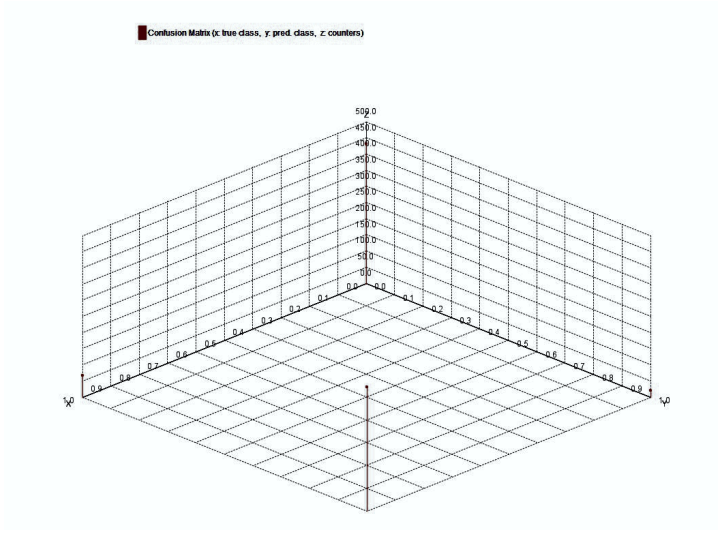

Figure 5 : Confusion Matrix of the version

The Raisin dataset contains an attribute "Class", which is label in the classification. This classification classifies the raisins into two types: Kecimen and Besni. The figures 6 depicts histograms for confidence (Kecimen) and Confidence (Besni).

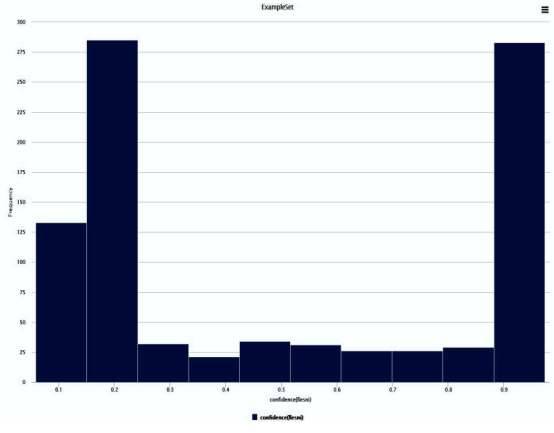

Figure 6 : Confidence (Besni)

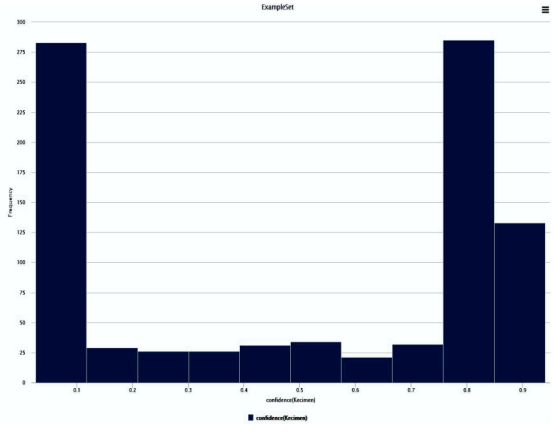

Figure 7 : Confidence (Kecimen)

The classification accuracy is calculated and achieved 90.44%. There are various other performance vectors which have been calculated. The details of various performance vectors are given in the **figure 8**:

accuracy: 90.44%

	true Kecimen	true Besni	class precision
pred. Kecimen	431	67	86.55%
pred. Besni	19	383	95.27%
class recall	95.78%	85.11%	

Figure 8 : Classification Accuracy of the Model

PerformanceVector

```
PerformanceVector:
accuracy: 90.44%
ConfusionMatrix:
True:   Kecimen Besni
Kecimen:        431     67
Besni:  19      383
classification_error: 9.56%
ConfusionMatrix:
True:   Kecimen Besni
Kecimen:        431     67
Besni:  19      383
weighted_mean_recall: 90.44%, weights: 1, 1
ConfusionMatrix:
True:   Kecimen Besni
Kecimen:        431     67
Besni:  19      383
weighted_mean_precision: 90.91%, weights: 1, 1
ConfusionMatrix:
True:   Kecimen Besni
Kecimen:        431     67
Besni:  19      383
absolute_error: 0.194 +/- 0.196
correlation: 0.814
cross-entropy: 0.383
```

Figure 9 : Performance Vectors

Figure 9 depicts the various performance vectors which indicate the performance of the model, the accuracy of categorization reached is 90.44 percent, classification_error: 9.56%, weighted_mean_recall: 90.44%, weights: 1, 1, weighted_mean_precision: 90.91%, weights: 1, 1, absolute_error: 0.194 +/- 0.196, correlation: 0.814, cross-entropy: 0.383.

Conclusion and Future Work

In this study, Random forest technique is used to predict the type of raisin. The dataset has been collected from UCI Machine Learning Repository about Raisins (Raisin_Dataset.csv). This dataset contains different attributes about raisins like: Area, Perimeter, MajorAxisLength, MinorAxisLength, ConvexArea, Extent and Class. The dataset is multivariate, having 900 numbers of instances and 8 attributes. As a consequence, the accuracy of categorization reached is 90.44 percent, classification_error: 9.56%, weighted_mean_recall: 90.44%, weights: 1, 1, weighted_mean_precision: 90.91%, weights: 1, 1, absolute_error: 0.194 +/- 0.196, correlation: 0.814, cross-entropy: 0.383. For future work, the model needs to get improved to have better

classification accuracy. There is large scope to improve the accuracy of the model using ensembling techniques or hybrid models.

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AN ANALYSIS AND VISUALIZATION OF DATA PROFESSIONALS' SALARY IN INDIA – 2022 USING R

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Abstract

Data Science is an interdisciplinary field that seeks to retrieve information from huge amounts of data. Data scientists use algorithms, mathematics and science to uncover hidden patterns in data and increase efficiency, productivity, profitability for business. Analytics is used for interpretation, systematic computational analysis and communication of meaningful patterns in data. Effective decision making can be made due to data analytics. To improve business performance organizations apply analytics. This paper visualizes and analyzes the data professionals' salary in India-2022 by using R programming.

Keywords: R, R-Studio, Data Visualization, Data Analytics

Introduction

Job of Data Analyst is in very high demand around the world. As a result, other software professionals have less salary as compared to Data Analyst in India. They have very high salaries. If a person updated itself regularly and have the required skill set, Data Analyst career keeps growing onwards and upwards. Salary of Data analyst in India is totally dependent on skilled and updated knowledge. If a person has good and updated knowledge, any company can hire him and give good salary.

Data analysts use figures, charts, numbers, statistics and convert into meaningful, understandable English language. Data professionals have higher salary due to their good skills in mathematics, statistics and Computer Science. As a Data Analyst the person should have knowledge of data mining and good knowledge of languages like SQL, Python, and R etc. Data Analyst extracts significant information from different data sets and visualizes that information using reports and graphs (Sharma, 2021).

A Data Analyst gathers, stores, and deciphers information to change it into important business bits of knowledge that can be utilized to further develop business tasks and cultivate information driven direction. This occupation is absolutely insightful, since it includes information parsing, deciphering and analyzing. The expanding interest for data analysts is increasing the data analyst salary in India day by day. Data Analysts decipher the stowed away data from inside enormous datasets and convey the data actually to every one of the partners in question - associates, business and supervisory groups, clients, organization accomplices, and so forth In view of the interest, Data Analyst salary in India is one of the highest

Skills required for a Data Analyst

Domain Understanding

To find the solution of any problem domain understanding plays very important role for data analyst. Without understanding the domain, data analysts do not understand the parameters require in a business for a significant change. Factors that affect the growth of a business must be known to data

analyst. Data analyst salary in India directly related to business understanding. The growth in business can be achieved by good understanding and deep insights about business. This skill set must be in data analyst.

Mathematics & Statistics

By good decision making any problem can be solved easily. Mathematics and Statistics makes a person confident and reliable to take decisions objectively. (Sharma, 2021). Data Analyst can make predictions from the historical information. He has the ability to generate patterns, segments, conclusions by using Mathematics and Statistics. (Kandel et.al., 2011)(Sharma, 2021).

Technical Skills

Data Analyst must have technical skills. By using domain understanding and mathematical skills data analyst identify and solve a problem easily. A data analyst needs to go through data sets and replicate the algorithms and provide with better business solutions. Tools such as Python, SQL and R play a crucial role in providing business solutions.

Soft Skills

Data Analyst must communicate the solution in the most simple and understandable format to the stakeholders. Soft skills plays a very important role for communication, whether a person might not know anything about Statistics, or root mean square error, or clustering algorithm or classification but where soft skills come in, everything becomes very easy to understand.

Data Analyst Job Roles

Data Science means Statistics can be implemented through different programming languages. Languages like R, Python is used in data science by which data can be retrieved and sorted out as per the requirements. Now a days, in India data science programmers or software developers earn more as compared to other software developers. Each company requires information of market and customers. After collection of data, data cleaning and processing is done to retrieve meaningful information. In major metros like Delhi-NCR, Mumbai, Pune, Bangalore and Hyderabad data scientists are getting very good salaries.

Experiments and Observations

Data Set

The Dataset consists of salaries for Data Scientists, Machine Learning Engineers, Data Analysts; Data Engineers in various cities across India 2022. It contains 4344 records and five columns Company Name, Job Title, Salaries Reported, Location and Salary.(Mooney, 2018).

Titles present in this Dataset

Data Scientist, Data Science Associate, Data Science Consultant, Data Science, Senior Data Scientist, Junior Data Scientist, Lead Data Scientist, Data Science Manager, Data Scientist - Trainee, Data Science Lead, Data Analyst, Data Engineer, Machine Learning Engineer, Machine Learning Software Engineer, Software Engineer - Machine Learning, Machine Learning Engineer/Data Scientist, Machine Learning Consultant, Machine Learning Data Associate, Machine Learning Data Associate I, Machine Learning Associate, Machine Learning Data Associate II, Associate Machine Learning Engineer. **(Refer Figure 1)**

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Methodology

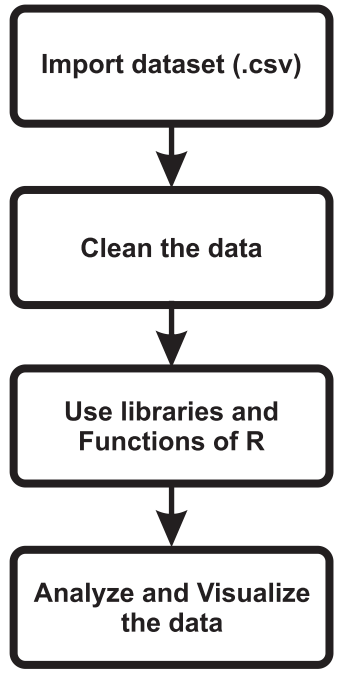

Figure 1 : Methodology

Parameters that affect the Salaries

Multiple factors that might influence the data scientists' salary-location, industry, years of experience, roles, and tools used so that professionals can maximize their data science salaries and work to their benefit as great enterprise data scientists.

Results and Observations

Table 1 gives the complete description of the data. It shows number of rows, number of columns, number of discrete columns, missing columns, complete rows and total observations.

Table 1 : Description of Data

Rows	4344
Columns	10
Discrete_columns	6
Continuous columns	4
All_missing_column	0
Total_missing_value	12974
Complete_rows	20
Total_observations	43440

By applying ggplot (Datacarpentry 2021), library and function plot of R to create this graph. It gives complete visualization of data. (Wilke 2019)

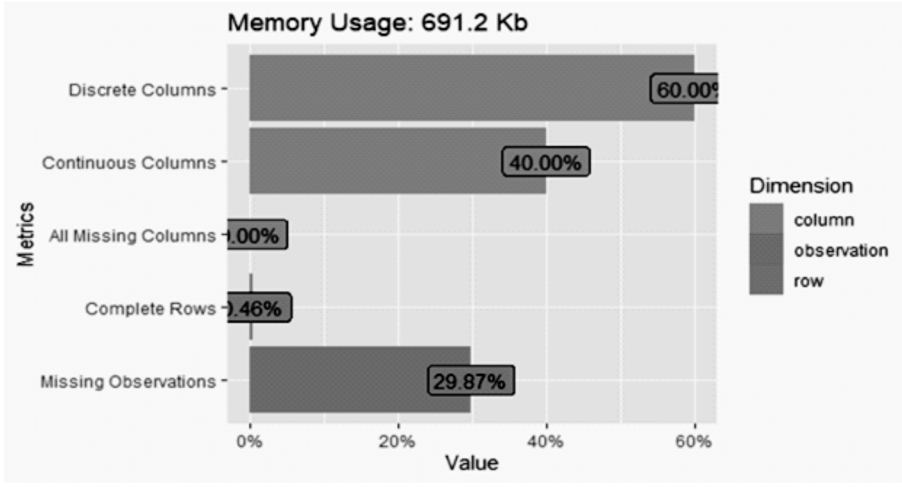

Figure 2 : Memory usage of Data Set

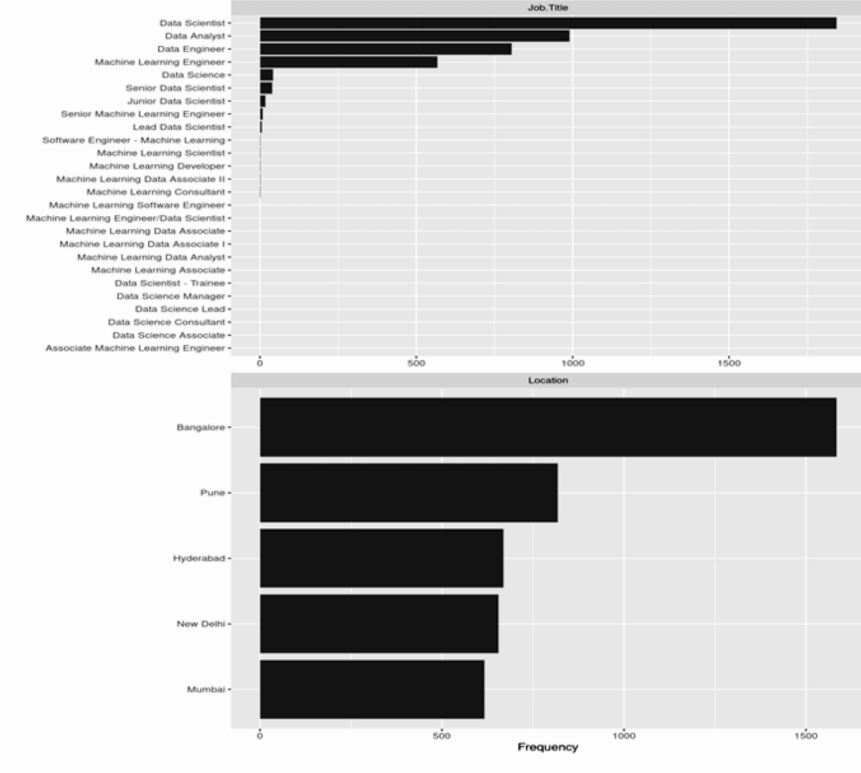

Figure 3: Job title, Salary and Location about the Data

Figure -3 describes the job title, salary and location about the data. It describes mainly 5 locations Banglore, Pune, Hyderabad, New Delhi and Mumbai. (Wickham 2018)

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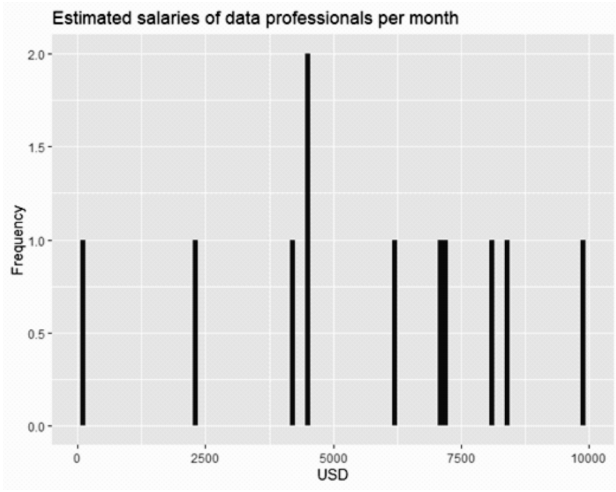

Figure 4 : Estimated Salaries of Data Professionals per Month

Figure-4 describes estimated salaries of data professionals per month. It shows that maximum data professionals have salary between 3500 to 4000 USD. Data Scientists have salaries near about 6000USD per month.

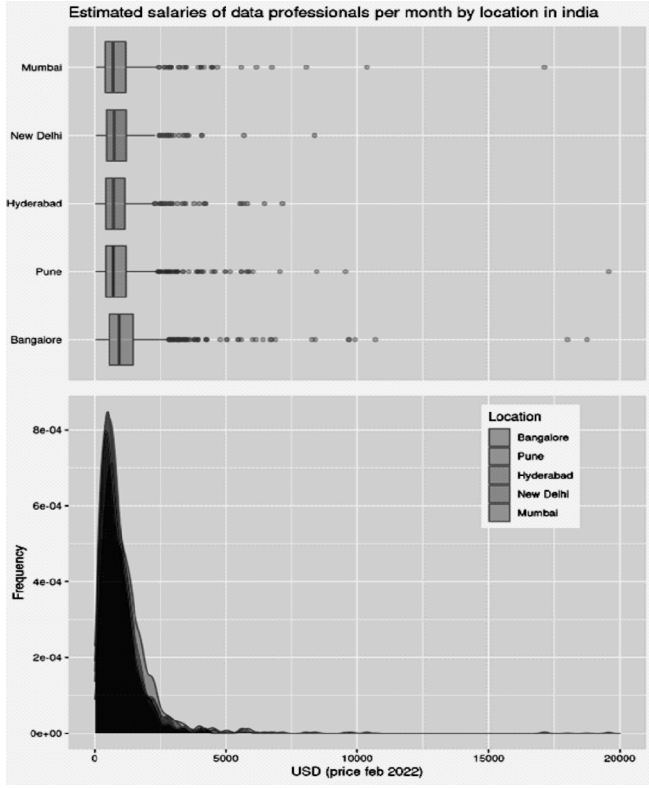

Figure 5: Estimated Salaries of Data Professionals Per Month by Location in India

Table 2 : Mean Salaries of Cities

Location	mean_usd	dev_usd
Bangalore	1318.5120	4305.3384
Pune	1325.1763	5238.1048
Hyderabad	1319.0484	5587.4395
New Delhi	935.9838	732.8731
Mumbai	1142.0104	3034.9252

Table-2 describes that location does not matter. Distributions are almost similar. New Delhi and Mumbai lag behind with the mean.

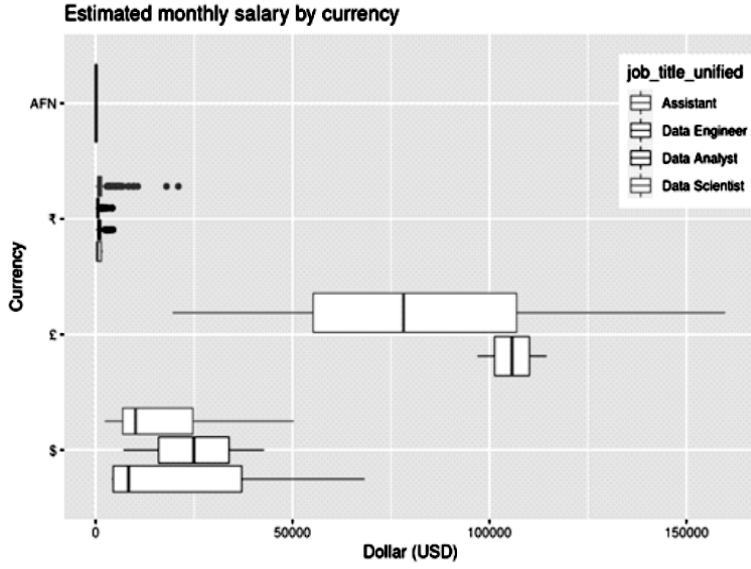

Figure 6 :Estimated Monthly Salary by Currency

Figure-6 shows monthly salary by currency. Salaries paid in Western currencies are higher than most of those paid in the local currency, reaching very high points, and establishing much higher averages. The euro even outperforms the U.S. dollar. It is clear that the jobs paid in these currencies is because they are foreign companies, which implies that within the country with a weaker currency, the profits are supremely higher.

Conclusion

This paper gives analysis and visualization of data professionals salary in India. It concludes that location does not affect the salary very much. Salary will be effected by designations and skill sets. It also describes monthly salaries paid in western currencies are higher then those paid in local currency.

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MULTI-JOIN-ORDERING QUERY OPTIMIZATION ALGORITHM FOR HIVE WAREHOUSE WITH MAPREDUCE

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Abstract

According to the Digital Report of July, 2021, Billions of users around the world uses Mobile Phones, Internet, social media every second. This huge range of heterogeneous digital data is called Big Data, and is measured in terms of terabytes or petabytes. It is difficult to the conventional relational databases to handle these heterogeneous data for data analytics, but is still in use significantly in the growth of Big Data. To handle SQL-based structured queries, Hadoop is one of the prominent and well-suited solution that allows Big Data to be stored and processed. Hive support SQL queries on Hadoop. Hive warehouse, is the oldest SQL-engine on the top of the Hadoop framework and to store the processed data, it uses HDFS (Hadoop Distributed File System). On the Hadoop, MapReduce is an execution engine that executes SQL-based queries. In the Query Optimization, join ordering always plays a significant role because when the order of tables in joining operation is changed, execution time of the query is reduced to a greater extent. The main problem of the Hive is that it does not enhance the order of the join for an SQL-query and also does not give assurance for an optimal execution plan. Its time complexity is measured in exponential (Shan, Y., & Chen, Y., 2015).The main focus of this paper is to discover the finest join ordering solution for a Hive query optimization problem through appropriate search algorithms and to improve SQL-based Hive queries performance with MapReduce–based system.

Keyword- Big Data, Hadoop, Hive, HDFS, MapReduce, Query Optimization Technique

Introduction

With the exponential growth of data with time in terms of volume, variety and veracity, it is extremely difficult for the traditional databases to handle complexity and demonstrate absolute performance in storing and querying data at high speed. Big Data Technologies play a significant role in handling heterogeneous data for better operational efficiency and intelligent decision making. In the age of the Internet, data is a treasure trove for any organization or system. Many organizations based on their data management strategies systematically believe in data warehouses which are vital for the growth of the organization. In the present scenario, huge amount of data (in terms of petabytes) is holed by the companies or organizations that cannot be managed by centralized servers. Due to these requirements, the data warehouse techniques have changed over the past few years and it uses high-end servers to holding huge amount of data to a set of commodity hardware machines in a distribution manner. The mapreduce programming paradigm from Google has facilitated this transformation by providing highly scalable and fault tolerant distributed systems for production level quality application software (Vissapragada, B., 2014). To handle SQL-based structured queries, Hadoop is one of the prominent and well-suited frameworks that allows Big Data to be stored and processed. Many traditional database venders such as Microsoft PolyBase, TeraData SQL-H, Oracles SQL and some researchers are also trying to migrate from SQL queries to the Hadoop

framework for faster response time. Apache Hive is open-source warehouse that is similar to SQL queries, which is used and discovered by several Hadoop users for their data processing requires. Apache Hive and its HiveQL (Hive Query Language) is one of the oldest SQL query engine on Hadoop framework and it converts HiveQL queries to MapReduce for processing and storing processed data in HDFS (Hadoop Distributed File System).

Hadoop: It is one of the prominent and well-suited solutions that allow Big Data to be stored and processed, for both unstructured data and for structured data. It is an open-source framework to store and analyze huge datasets on a cluster of machines in a distributed style. It stores large files into block. If these blocks compressed indivisibly, they improved throughput time and speedup the block performance. Basically, they used LZO compression algorithm for effective block processing. When the size of data increases, Hadoop MapReduce cost and execution time is much better than traditional database system such as Microsoft SQL server. Some significant features of Hadoop - Fault Tolerance, High Availability, Scalability, and Reliability so on. Hadoop Ecosystem is a platform that offers a wide range of services to solve Big Data problems. There are two important elements of Hadoop - HDFS and MapReduce.

MapReduce: It is a batch processing tool which works on Java programming. It has two parts- Map converts data into key-values and takes the data from HDFS for processing, while Reducer takes the data from Map and generates new key values as final result and submit to HDFS.

Hadoop Distributed File System (HDFS): It is a cost effective and fault-tolerant storage system of Hadoop framework. It is a Java based data storage system that stores data in the form of small pieces (blocks). It creates many copies (replicas) of each data blocks for fast computation. It's also called Master-Slave model. It is further divided into two parts namely Namenode and Datanode. Namenode is also known as Master Node and it does not provide storage facility. It only stores and manages the Datanodes, The Datanode takes care of the data location, size & number of data, availability of data blocks etc., Data node is also known as Salvenode and is responsible for storing actual data block and performs various operations on it such as Read & Write, Replication, Deletion operations. Every Datanode consists of two segments, The first segment is used for storing data files and the second segment is used for storing the copied metadata.

Apache Hive: Many SQL supported open sources include Hive Stringer, Implala, Hadapt, Data HAWQ CitusDB Rainstor, MapR and Apache Drill etc (Pal,S., 2016). On Hadoop Framework, Apache Hive and its HiveQL language is considered to be one of the oldest SQL query engine. It was coined by Facebook in 2007, later taken over by the Apache Software Foundation and released the first version of Apache Hive in 2012. It is an ETL and data warehouse tool that uses HQL (Hive Query Language) similar to SQL-Relational Database Language for batch processing on structured data in a Big Data environment. It converts HiveQL queries to MapReduce for processing and stores processed data in HDFS.

Important Features of Hive are- File Styles -Avro files, Sequence File, ORC, Text File, RC File, Parquet, and LZO compression (Bagui, S., & Devulapalli, K. ,2018), all file format are supported by Hive. Sequential Files are suitable when user is storing intermediated data in the MapReduce joins, whereas ORC and Parquet are optimal for query processing in Hive and these files cannot be updated. Avro is the best option when there is a change the schema over the time but the

performance of the query is slower than ORC and Parquet. CSV files are perfect for extraction of data from Hadoop that work on Python or Java and also support different columns styles for partitioning the data in order to improve query performance.

Data Types- Various scalar data types like Integer, Float, Double, String to name a few and composite datatypes like Struct, Arrays, Maps, List etc are also used by Hive for executing complex queries. It stores data in tables similar to traditional database, where every table constructs rows and each row stated columns. Each column has a related type–Primitive Types (Integer- [Tinyint(1 bytes) int (4 bytes) , smallint (2 bytes), Bigint (8 bytes)], Float- 4 bytes, Double-8 bytes) and Complex Types which including Associative arrays – map <key-type, value-type>, Lists – list <element-type>, Structs – struct <file-name: field-type, ... > to name a few.

The next Section describes the Architecture and Query Processing of Hive, Section-III focuses on the Query Optimization for Hive Query. Section-IV focuses on the MapReduce Query Execution Engine. Section-V focuses on the Literature Review and the related work and the final section draws the Conclusion of this research paper.

Hive: Architecture and Query Processing

Hive Architecture and Query Processing by Hive-Hadoop Ecosystem has been described in **Figure-1.** Firstly, the user sends SQL- based queries through various database engines like JDBC, ODBC, Thrift Drivers, CLI Command Line Interface) and WUI (Web User Interface) to the Hive server and the Hive server sends these queries to Driver for execution. The Database Driver collects these queries from different sources and transfers it to the compiler where the execution of the queries takes place.

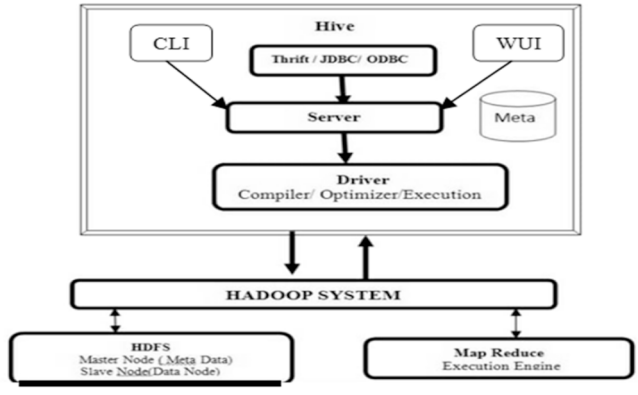

Figure 1: Hive-HadoopEcosystem [Bagui, S., & Devulapalli, K. (2018)]

The compiler then checks the syntax of the query and performs validation by Query Parsing Technique. After that semantic analysis is performed on the query and then the query is transformed from HiveQL statements into MapReduce Job. The Hive MetaStore is used as a storage area to store the structure of the data of the several tables and their partitions. It also contains metadata, which is used for read & write operations and the HDFS files is used for the data storage. (Bagui, S., & Devulapalli, K. (2018) **(Refer Figure 2)**

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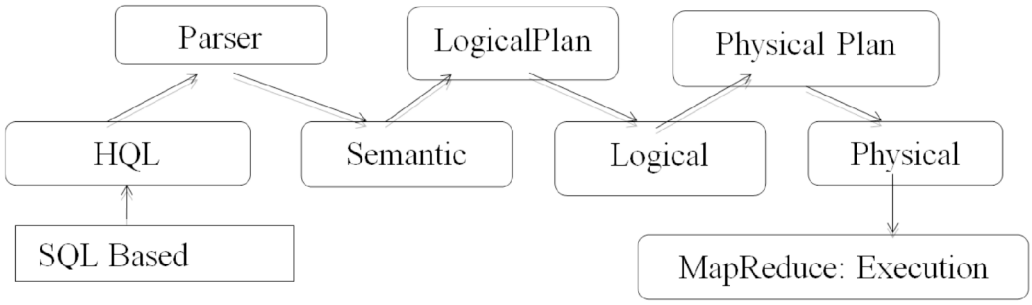

Figure 2 : Query Optimization Process in Hive (Pal, S., 2016)

There are three major components of HQL query. The first component is Query Optimization that is responsible for discovering the best Query Plan for the query. The second component is Query Execution Plan that indicated the best query plan and the third component is MapReduce Query Execution Engine which is responsible for query processing.

These three components can be explained via the given example.

UserQuery-1 (Shan, Y., & Chen, Y., 2015)

"Select * From R1, R2, R3, R4 Where R1.A=R2.A and R2.B=R3.B and R3.C=R .C;"

QP1 Left Deep Tree (Plan) **QP2 Bushy Tree (Plan)**

Figure 3 : Query Plan (QP) for Query (Wu, S., et.al. 2011)

MapReduce

According to the existing work (Wu, S., et.al. 2011) (Afrati, F. N., & Ullman, J. D., 2011) a query generates two query plans which are shown in Figure 3. The first Query Plan (QP1) is called Left Deep Tree Query Plan and the second Query Plan (QP2) is called Bushy Tree (BT) Query Plan. Bushy Tree is considered to be more effective and efficient as the query execution plans generated by optimizer can be involved in parallel binary join operations. In the present era, MapReduce is based on a shared-nothing model and it leverages commodity hardware to efficiently handle data of the large-scale (Shan, Y., & Chen, Y. 2015). It is finest option to execute parallel SQL query execution plan (QEP) (Okcan, A., & Riedewald, M., 2011). Although many studies state that there is no need to split multi-way join into binary join in MapReduce frame work because only one MapReduce is sufficient to perform multi-way join as compared to using set of binary joins (Zhang, X., et al., 2012) and it also improves I/O cost and execution time of the query. Several studied have also focused on how to apply join operations in the MapReduce (Shaikh, A., & Jindal, R., 2012) (Olston, C,. et al. 2008). MapReduce doesn't support directly join algorithm. So, there are two significant concepts that are used to improve query execution time and I/O cost with the help of Two-way and Multi-way join algorithm.

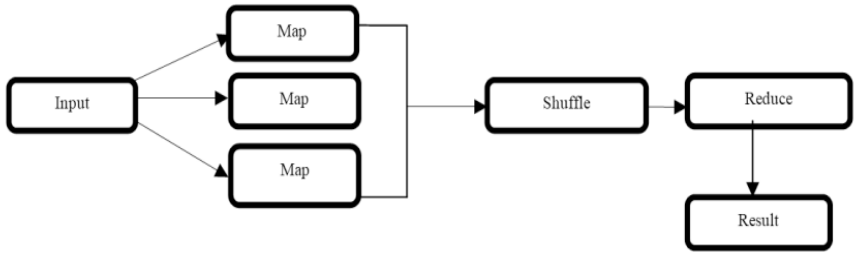

Figure 4 : MapReduce

Query Optimization

Query Optimization is an important method which always plays a vital role in query execution. There are many techniques of query optimization like Partitioning, Bucketing, Using Compression, Using ORC Format, Cost-based Optimizer and Join Optimization etc., that help to improve query performance. When queries use join operator between the multiple tables through their common attributes, join ordering will have a substantial impact on the reduction of execution costs. Query Optimizer is responsible for finding the efficient and minimum cost-effective query execution plan for speedy query execution. According to many researchers, Dynamic Programming Algorithm deals with relations efficiently when the number of joins in the join queries is usually less than 10. When the number of the relations increases the Dynamic Programming raises a problem a space and time complexity. In the big data environment, there are more than 100 tables that may be used in the join operation and hence this becomes one of the prominent reasons for proposing an effective Join Ordering Search Algorithm. Considering an example of joining three relations namely R1, R2, R3 of data size 10 tuples, 1000 tuples and 10,000 tuples, the query plan that joins R2 and R3 first take more execution time as compared to the query plan that joins R1 and R3 first (Kadkhodaei, H., & Mahmoudi, F., 2011). There are numerous of execution plans, but it will be important that the most appropriate plan is adopted, not all execution plans are equal in term of efficiency as the data size and the participating relations in the join operation increase or decrease. The Join Order Problem is extremely exigent as finding the optimal query execution plan for large scale queries is defined to be a NP-Hard problem.

Description of Join Ordering

There are four relations known as R1, R2, R3 and R4 that are used in the above-mentioned join query. Here, simple Select-Project-Join (SJP) query is considered without any aggregates and sub-queries as it involves large set of joins and SPJ queries are very time consuming. The Query plan is represented in the form of a structured tree which can be defined as either Left Deep Tree or Bushy Tree (**figure-3**). When a user enters Hive SQL query, the query parser checks the syntax and semantics of the input query and performs validation checks on the query. The input query is then forwarded to the query optimizer that generates multiple query evaluation plans in the form of the query graph. Each node in a graph represented as a relation (tables) and each edge represents a join operator between the connecting relations of the query. Through this query evaluation plan, the optimizer arranges the order of the nodes is known as Query Execution Plan (QEP). The focus of this paper is to unearth the strategies that help in generating sub-graphs from join query graph and assign an MR (MapReduce) to each sub-graph which executes all graph edges in minimum time.

In addition to the Order of Joins that impacts the performance of the Input Query, the type of join operation is also considered to be an another parameter that has considerable effect and impact on the cost of final query execution. Broadly two types Join Algorithms are defined namely Two-way join algorithm (In Memory Join, Reduce-side Join, Map Side Join, Broadcast Join, Map–Merge Join, Repartition Join, Bloom Filter Join etc.) and Multi-way Join Algorithm (Reduce-Side Cascade Join, Map-Side Join, Reduce-Side One-Short Join, etc) (Thusoo, A., et al., 2010).

This paper focuses on the replicate join (Zhang, X., Chen, L., & Wang, M., 2012) that extends repartition join, and is represented as a Chain (R1 ⋈ R2 ⋈ R3 ⋈ R4) in relational algebra that support multi -way join and improve the efficiency of the query processing.

According the fig-3, there are two query plans of query1. First plan is a Left Deep Tree (LDT) and another is a Bushy Tree (BT). In QP1, it can be represented as R4 ⋈ R3 ⋈ R2 ⋈ R1in the relational algebra format and is represented as chain join because join G dependent on F, and F is dependent on E whereas QP2 is not a chain join, it can be represented as (R4 ⋈ R3) ⋈ (R2 ⋈ R1).

The Cost of (QP1) is | R4|+|R3 |+|R2|+|R|+|E|+|F|+|G|=1510 and cost of QP2 =1270.

Figure 5: Represent of the Query Plan 1 and Query Plan 2 (as shown in figure 3) In MapReduce (Chen, Y., et al., (2014)

Cost Model

The execution cost of the query with Replicate Join (Shaikh, A., & Jindal, R., 2012) (Olston, C,. et al. 2008) using MRA is defined as the summation of the MR_n, Cost (MRA)=$\sum_i$Cost(MR_i), The cost is equated as the sum of total mapper input size and shuffle data size. Total Cost of MRA={MR1, MR2, MR3,…MRn}and at the last combine all sub-queries and finds the minimum Cost (MRA). **Figure-5**, shows the two valid execution plans for query plan of **figure-3** (QP2) using MapReduce. For EP2 the sum od the total input cost is calculated as MR2 = |R1|+ |R2| + |F| = 130. To calculate the shuffle data size, the total number of times each tuple is replicated from mapper to reducer is calculated. Since, Cost (MR2) has 2 join keys so each tuple in table R1 and table F are replicated twice. Therefore the shuffle data size= 2*| R1|+|R2|+ 2*|F|= 220 and hence the total cost is Cost of MR2=350. Similarly for MR1 of EP2 in fig-4, Cost (MR1) =160, final result for the corresponding MRA, Cost (MRA) =510. The Time Complexity to search for Best Query Plan with Left Deep Tree and Bushy Tree for Polynomial algorithm is $O(n^2)$ (Vissapragoda, B., 2014). When this system is compared with others, AQUA (Ganguly, S. et al., 1992))and Hive, uses exponential algorithm for SQL queries in MapReduce. There are many scopes to improve the join order query performance through non-deterministic algorithms, metaheuristic algorithms etc.

Related Work

Several studies on Relational database have been conducted which focused on SQl Queries for Parallel Processing. These queries are first converted into executable Query Execution Plans by the Query Processor on the basis of binary join operation. (Afrati, F. N., & Ullman, J. D., 2011).

AQUA [Automatic Query Analyzer] generates the MapReduce jobs for every query to reduce the cost of query processing in two phases. In the first phase, the query is parsed into a group of join operations. Every group has many join operators and single MapReduce is used to calculate each group. In the second phase intermediate result generate the final result of the query and select the best plan which minimizes processing cost. This an optimization module that used replicated join algorithm to reduce I/O costs and it helps to avoiding to large number of intermediate results in MapReduce. In Hive, this method system represented the plan in expression tree. The Hive's analyzer receives this expression and applies metadata of tables to convert the tree into a MapReduce.

JOMR [Join request in MapReduce] (Chandar, J., 2010) algorithm focuses on the order of Join the tables in MapReduce because it helped to improve the performance of MapReduce. In the traditional database, join algorithms avoid the importance of order of tables but in many conditions, researchers observe the order of tables is important to find out the best plan of query execution. According to this method, researcher evaluates various multi join query execution plans and alters the join order of the tables and selects the minimum cost plan of join. For this reason, Travel sales problem (TSP) used MapReduce to improved join order plan and set minimum join cost. This method applies in Hive to improve the intermediate results of MapReduce by changed the order of multi join query. It uses some statistics like data size, count of rows and records etc in Hive to store the information in database to improve the query execution plan. In this paper JOMR method creates new join order of query of MapReduce. JOMR construct least cost of multi-join query by using TSP and cost between tables to evaluate and create the best order of join. This method enhanced more while ever-increasing the number of joins.

SQLMR[SQL-based and MapReduce]- Due to the increases of data, SQL based databases are not capable to handle scalability of the huge data but MapReduce is the best framework to solve large data processing and it also provide scalability and fault-tolerant. Most of the users are familiar with the SQL-like data processing so need for the solution to execute large scale data processing with SQL-based queries. SQL MR, is a hybrid approach of SQL-like databases and MapReduce data processing. The main components of SQLMR framework are: SQL-to-MapReduce, Compiler, Query Result, Partitioning and Indexing, and the Hadoop system. In this framework, a complier is transformed SQL-like queries to a MapReduce job and it stores SQL-based files directly in the HDFS. It uses minimum overhead data file construction technique to minimize conversion time between SQL and MapReduce in Hadoop system. In this framework the complier sends the query to the Manager to compare with the previous query. If the query is found in the cached, the result is directly sent to the user without re-processing the query. So, this design can reduce the pre-processing time extensively. Partition Index and B+ tree indexing techniques are used to improve the accelerate data accessing and searching in the cloud database for traditional database query. SQLMR performance also depends on the system where queries are executed. To improve Hadoop performance cross-rack application is used for optimization.

Conclusion

Multi Join Query Optimization (MJQO) plays a significant role in various application like-search engine, data mining, data warehouse and banking system etc. As the data size increases day by day and due to insufficient technology, multi join query optimization problem remains unsolved. The

Problem of MJQO include large number of join queries, high processing cost and long query execution time. There are limited studies that have been performed on join ordering for SQL-based queries on big data environment. Hive uses exhaustive algorithm for join ordering query optimization and taken long time to produce result in exponential time complexity. Basically, Hive and Pig are not providing optimize join sequence. Traditional methods like Exhaustive Search and Greedy Algorithms are not able to solve this optimization problem efficiently for Hive- SQL based queries. Therefore, there is need for the non-Exhaustive algorithms for optimal solution with better performance in Hive based SQL query.

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ARTIFICIAL INTELLIGENCE AND THE FUTURE OF POWER-5 BATTLEGROUNDS

Rajiv Malhotra
Rupa Publications India Pvt. Ltd.
Pages 486

One of the biggest issues fronting nations in the modern world is the rate at which digital transformation is happening. This transformation is so quick, wide-ranging, and massive that realizing its impact itself is tough for humanity.

Technologies such as big data analytics, artificial intelligence, machine learning, deep learning, cloud computing etc. are converging fast and encompassing us like never before. Control, thus is getting accumulated with few technology companies, and this situation looks frightening.

Technology users are knowingly or unknowingly placing their private information in the hands of these companies. They get to know more about us than us and can influence our choices by anticipating our probable reactions. Video surveillance cameras placed across the nooks and corners of the city record all our movements and even facial features even without our knowledge. Mobile applications also get users' personal data under the garb of providing them with free and attractive services. Artificial Intelligence algorithms are scrutinizing users' personal data stored across platforms, without their knowledge and controlling their conduct.

The author is a very experienced hand at the subject that he has written about. A Physicist and an AI specialist Rajiv had a successful corporate career in the USA. He then founded several IT companies in 20 countries. In the 1990's he established a non-profit organization, Infinity Foundation in the US where he has been studying civilizations and their engagement with technology from different viewpoints. Malhotra has also authored several best-selling books. This diverse experience and specific interests give him the requisite knowledge, substance and authority on the study of intrusion of technology and its impact on nations, and humanity as a whole.

In this thought-provoking book, Rajiv Malhotra compels the reader to contemplate how the personal information acquired by the BigTechs through several apps and websites is used by them. He also instigates policy-makers to recognize the power and expanse of technology in a nation's security and to find ways to safeguard humankind from the invasive envelopment of technologies. The author draws attention towards the need for launching extensive open deliberations on where the admixture of new and existing technologies is heading. He fears that this will lead to eventual unprecedented and inadvertent dependence and subjugation of humanity.

Rajiv, as reflected in the book title, recognises five battlegrounds in the Artificial Intelligence backdrop. These five battle grounds are economic development and jobs, global power, psychological control and agency, metaphysics, and India's future.

The book has been divided into two parts, part one is titled, 'Algorithms versus Being' and part two is 'Battleground India'. In part one, the author discusses the first four battlegrounds in detail while part two is dedicated to the impact of technological churning on India.

The author begins with an introduction to Artificial Intelligence, evolution of AI devices, its

applications, discusses Intelligence and Consciousness, and the debates and controversies related to AI and its applications to provide a background to the reader about AI in general. He then goes on to discuss the battle grounds one by one.

In the first battleground, the author feels that AI and upcoming technologies will lead to reduction in jobs and hence increase in unemployment. The new jobs that will be created due to implementation of AI will more for those with higher education and therefore increase the socio-economic divide. The solutions that are currently being looked at for addressing this issue are more temporary and unreasonable in the long run.

The second battleground identified by Malhotra is for world domination. The major players being USA and China, the ambitions plans of China, the recognition of the threat and subsequent responses by the US are discussed in good detail. The author covers the core AI aspects and strategies of China and the counter strategies of the US, and also touches upon the impact of the Sino-US tussle on India and the rest of the world as he deliberates on the power struggle.

Rajeev Malhotra's third battleground is psychological control, and forfeiture of a person's power of agency. It is often thought that the ability of a computer to regulate or influence human conduct is not real, but the author foresees AI-based technologies generating a false sense of agency among the masses as they surrender their power to the machines.

Battle ground four is metaphysics. The author attaches much significance to the difference between intelligence and consciousness while emphatically stating the distinction between the sthula sharira i.e. physical body and the sukshma sharira i.e. the mental and psychological body. Rajeev observes that since AI has been able to train computers to generate smart choices, the belief that life, mind and consciousness are just like programs running on human machines is being accepted by some.

The author discusses Elon Musk's Brain Machine Interface, and Noah Harari's view of the superhuman of the future as a path to artificial immortality, artificial happiness, and even artificial divinity, to give the reader a vision of what the thinkers are thinking. His description of the crash of the civilization is scary and just the thought of the brain being embroiled in the internet of things and subsequently the internet of brains in exhausting. Rajiv conveys that digital dehumanization due to biological materialism could be attractive in the beginning with the machines taking up all our tasks including decision making, but will eventually lead to moronization of the population.

The fifth battle ground discussed by the author is India. A populous, technically sound, and English-knowing country is a great opportunity for the global tech which is looking for acquiring power by way of digital colonization. It is luring the users of mobile applications and other digital utilities by providing attractive freebies to divulge their personal data. It is also taking measures to curb the development of India's own technical infrastructure.

Rajiv Malhotra is of the opinion that it is time for India to take urgent steps to advance its AI and related technology research and implementation. He feels that if we don't wake up soon we may be on our way to be a colony yet again, but this time a digital colony. The expertise that we have earned over the years as a technology-knowledge rich, inexpensive and experienced manpower can be put to use on a mission mode to take control of our own selves as a nation.

Though there are great benefits of AI, the book is written with the objective of acquainting the reader

with the fronts of concern that AI is opening up. Rajiv could have, as a technologist and a strategist, also suggested some solutions to the problems that he has identified. The book follows an academic format, with chapter synopses, conclusion, bibliography, and glossary. Illustrations aid the reader in easily understanding the issues. The content is written in a very simple language.

The book may leave the reader in a gloomy state as (s)he goes through the digital engulfment, the reader may even feel like being drawn into a vortex, but probably it is only this feeling which may push us to apply all our might and come out of the swirl. The policy makers, tech giants, technology experts, and users, all will have to come together for this. A must read for all these sections to understand the volume, severity, and impact of the problem, and may be to subsequently also chart out the future plan of action.

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DEFINING MANAGEMENT: BUSINESS SCHOOLS, CONSULTANTS, MEDIA

Lars Engwall
Matthias Kipping and Behlül Üsdiken
Routledge
Pages 334

The book describes about management as an idea and practice from the times when it was confined to churches, households and few official establishments to the current time when it is ubiquitously seen in almost every aspect of life laying emphasis on the role of business schools, consultants and media.

Defining Management aptly tells us that evolution and development of management education and business schools was not predictable. The book sources origin of management education from vocational schools of commerce which entirely differed from the institutions associated with training national elites. The authors share with us that every country followed different path of developing their institutional strata of management education.

The publication of Defining Management is quite relevant and appropriate. Management studies are very popular domain of study today. Management is an essential element of our daily lives. The book conjuncts all chapters beautifully as they bring together the past of B-schools, consulting and business media. It gives a good definition of management and percolates down true management knowledge for practitioners.

The book lays emphasis on institutional theory. It covers the formation of management education field which is defined by the three institutional shapers of management education: business schools, management consultants and business media. To say differently, the field is the scene of action, where the development of management thought, practice and learning occur. At the same time, it is in the jurisdictional battlefield where what constitutes 'good' management is highly contested.

The key rationale for this text is reflected through the lifelong work of the three authors who have studied the origin, development and extension of management ideas through edification, referring, business journals and books.

The contribution of authors to the book is three dimensional i.e it is temporal, comparative and consolidative. The book is a rectilinear assemblage of dates and facts about the three influential 'management authorities' viz. B-schools, consulting and business media.

'Defining Management 'enriches us with the understanding of B-schools and management education beyond the specific boundaries of a country. It makes us understand the meaning of the two universally, where the development and evolution of the two took place in different countries. The mini cases boxed in the book relating to authors of management and institutions give us valuable understanding as how management thought and education developed.

The book throws light on how the concept of Management has evolved in due course of time. In so doing, it gives us miniscule insights about the three critical catalysts in rightly defining the term 'Management'. The changing paradigms of Management have been rightly captured by the authors. The book presents a chronological sequence of development of the dynamism in Management. The

authors have quoted several examples from different countries citing evolution of Management in governments, private concerns and even in households and social groups.

The book provides useful and rich source of information to management students, business houses and government agencies about evolution of Management who want to study it as a discipline. The book comes in handy for voracious readers too who are keen to understand the dynamics of a subject which is alien to them. The language of the book is not gobbledygook for readers.

The book enriches concepts about management education. It states how principles of management have evolved from day-to-day life. It structures management principles into theory from examples and reinforces Management theory into practice.

The book entails crucial role played by the B-Schools of the western world in defining Management. It discusses at length, importance of the B-Schools of the USA, a country which is also the epicenter of management education in the world. The authors have given a chronological sequence of evolution of management education after the American War of Independence that ended in 1783.

The authors have also explained the impact of technological and socio-economic changes on management education. The impact of industrial revolution on management education in the world finds specific mention in the book. It takes a comprehensive account of instances of industrial revolution in the western world. It enriches us with ever changing business landscape and its impact on management education.

In the wake of unfolding developments like emergence of new industries, innovations, impact of competitive forces, alternative business models and new formats of business practices, the authors have created an interesting body of knowledge and information. It gives an interesting account as how management education has evolved as a reflection of these unfolding developments and witnessed a paradigmatic shift through time and how the business schools, consultants and media have shaped it in light of these developments.

The authors have also covered the value-based aspect of management education. The book gives an account of prescriptive standards of management education, an approach that has taken rapid strides in the 21st century. The shift from descriptive to normative approach in management is covered by the authors as a recent trend.

To conclude, the book gives valuable insights about spatio-temporal evolution of management education.

Vision:

To be globally responsive and socially conscious, committed to innovation and creativity by developing and disseminating knowledge and practice for learning and resource use optimization. And to emerge as an organization with an optimal blend of value based growth and future preparedness, leading to prosperity of the society and nation at large.

Mission:

"We stand committed with a spirit of enterprise, will to succeed, zeal to grow and objective-achievement orientation through value based education for community at large by creating an environment of intellectual stimulus, scientific orientation and social responsibility".

Goals:

- To develop a comprehensive worldview in the students with respect for all forms of life and foster an environment where people work together and are motivated to succeed.
- To inculcate the zeal for individual excellence and yet reinforce the importance of team work.
- To support a proper harnessing of latent talents and to encourage the students to take initiatives.
- To provide an environment, in which the students and the faculty are driven by the spirit of enquiry in their quest for knowledge.
- To Enhance logical, creative and analytical skills.

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