

A Study of Sentiments of Employees during COVID-19

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ABSTRACT

Sentiments are mental attitudes and play an important role in forming opinions. Sentiment and emotion are interchangeably used, however have different meanings. The sentiment is a mental attitude or a thought influenced by emotion and has an important role in forming opinions and influencing future decisions of others. Employees are knowledgeable assets for any organization, and their sentiments about their organization, managers, co-workers, etc. create an opinion. The emotional well-being of employees has a direct relationship with the performance of the organization.

The World Health Organization declared COVID-19 as a pandemic on March 11, 2020. Many countries declared lockdowns, with unimaginable restrictions to control the spread of this pandemic. This resulted in organizations swiftly adapting to work-from-home methods, almost overnight. This paper studies the sentiments and emotional wellbeing of employees during the COVID-19 pandemic. The study was conducted undertaking a review of the literature and adopting a framework for sentiment analysis and emotional wellbeing. The study shows that employees have mixed sentiments of feeling excited, positive, anxious, angry, and negative. Most of the participants with positive and excited sentiments believe that this pandemic has created a challenge as well as an opportunity.

Keywords: Sentiments, Analysis, Emotional Wellbeing, Employees, COVID-19

INTRODUCTION

Sentiments are mental attitudes or a thought influenced by emotions. Emotions are feelings, thoughts, moods, temperaments; and are physical, expressive behaviors of an individual. Sentiments and emotions are related to each other, with sentiment as a mental attitude and emotion as an action.

The World Health Organization declared COVID-19 as a pandemic on March 11, 2020. This declaration was followed by countries declaring lockdowns to control the spread of this pandemic (WHO Director-General's opening remarks at the media briefing on COVID-19 - 11 March 2020). This resulted in organizations swiftly adapting to work-from-home methods, almost overnight. Some organizations, especially from the service sector, had a work from the home process, but many other organizations like manufacturing, education institutions, etc had never planned for a work from home.

Sentiment analysis has gained popularity amongst researchers and is an interdisciplinary study from computer science to the management sciences and social sciences due to its importance in business as well as society. This paper is a study of sentiment analysis of employees.

LITERATURE REVIEW

The primary objective of the review of literature is to understand the concept of an employee's sentiments, sentiment analysis, and emotions, and to identify tools for carrying out sentiment analysis from a short text.

Sentiment analysis is used to find the opinions of individuals who write or post their views on a specific entity. "*Sentiment analysis systems are being applied in almost every business and social domain because opinions are central to almost all human activities and are key influencers of our behaviours*" (Feldman, 2013). A new joiner would be interested in knowing about the prospective employer by surfing their website and reading

social media posts of former and existing employees of the organization. Such opinions guide and influence the decision of others.

Sentiment analysis, also referred to as opinion mining is the field of knowledge that analyzes an individual's opinions, sentiments, emotions & attitudes from written language normally using natural language processing. The analysis is carried out by examining subjective statements from user-generated texts to detect user attitudes and classifying them as neutral, positive, or negative (Liu, 2012).

The sentiment analysis process involves collecting and analyzing a large set of data, creating data models, using natural language processing, and artificial intelligence capabilities to get an insight into sentiments expressed in written statements. The sentiment analysis is carried out using software application tools or using an application program interface (API) with python or R or other development tools. Most of these tools have an interface with popular social media websites like Twitter, Facebook, etc. to connect and collect user posts in real-time for sentiment analysis.

SentiStrength is one of the tools for sentiment analysis and has been peer-reviewed in many research and academic articles. This tool is available for free for academic and research purposes (SentiStrength. n.d.). SentiStrength comes up simultaneously with positive sentiments (from 1 not positive to 5 extremely positive) and negative sentiment (-1 not negative to -5 extremely negative) for the same text. This approach of using positive and negative sentiments in parallel is recommended in some of the research papers (Berrios et al., 2015). The tool can analyze the behavior and uses an algorithm for sentiment strength from informal texts, using new methods and styles of internet posts of users. *"Applied to MySpace comments and with a lookup table of term sentiment strengths optimized by machine learning, SentiStrength is able to predict positive emotion with 60.6% accuracy and negative emotion with 72.8% accuracy, both based upon strength scales of 1–5"* (Thelwall et al., 2010).

NLTK, the natural language tool kit, is an open-source tool widely used for sentiment analysis for academic research with python language (Loper et al., 2002). NLTK leverages symbolic and statistical natural language processing capabilities. It has an easy to use interface with several text processing libraries for classification, tokenization, stemming, tagging, parsing, semantic reasoning, and wrappers, supported by handy documentation & discussion forums (Natural Language

Toolkit. n.d.). NLTK is used for Computational Linguistics and scientific research in the field of natural language processing (Lobur et al., 2011).

One of the studies has analyzed sixteen different cloud-based sentiment analysis offerings from smaller players on seven different capabilities viz. entity recognition, sentiment analysis, language detection, keyword extraction, classification, summarization and linguistic analysis. The Indico & Semantria sentiment analysis tool meets all the six criteria, while Aylien, MeaningCloud, ParallelDots & Rosette meet five out of six criteria. Other tools meet less than five criteria of the study. Most of these tools have a Microsoft Excel plug-in and API interface support (Dale, 2018). The sentiment analysis tool offered by Indico doesn't support sentiment analysis from text and doesn't seem to be fit for employee sentiment analysis. (Use Cases. n.d.). The solution from lexalytics, known as Semantria can be used to understand people's sentiments from free text and can help reduce turnover, improve employee engagement, and raise the productivity of employees (People Analytics & Voice of Employee. n.d.).

The sentiment analysis solution from Aylien is for media monitoring, risk intelligence, and adverse media screening, and it doesn't prima facie cater to employee sentiment analysis (Solutions. n.d.). The solution from Rosette has text analytics capability, however, it needs a license to carry out complete text analytic. The free version has a limitation of a maximum of ten thousand words for analysis (Capabilities. n.d.). The solution from paralleldots has APIs, that can be plugged in with Microsoft Excel and used for people sentiment analysis from texts (Text Analysis APIs. n.d.). The meaningcloud sentiment analysis tool can analyze free text and has a use case for analyzing the voice of employees for performance review, organization context, and exit interview (Text Analytics. n.d.).

A similar study of the tools from larger companies viz. IBM, Microsoft, Google and Apple recommend Amazon and IBM on product capabilities with fairly good documentation (Dale, 2018).

A word cloud is a visualization of keywords in the text using weighted algorithms prominently displaying repetitive underlying keywords. Such tools can be developed using R or python and are used in academic research work. (Jin, 2017). The combination of word cloud visualization and sentiment analysis from the large complex text data improves the human understanding and reasoning in the findings (Risch et al. 2008). Worldle

is one of the word visualization tools recommended for supplementary research, allowing researchers to quickly visualize general patterns in the text (McNaught et al., 2010). The ultimate goal of visualization techniques is to enable human understanding and reasoning about the contents of large and complexly related text collections.

Emotions are feelings, thoughts, or expressive behavior of an individual, that leads to an action or a reaction due to internal or external stimuli (Myers, 2004). The human nervous system triggers emotional actions, a core function of the human brain. "Emotions constitute a primary motivational system for human beings" (Izard, 2013).

One of the widely used frameworks for measuring the emotional well-being of employees is the PERMA framework. This framework has the multi-dimensional measurement with P for positive emotions, E for engagement, R for a relationship, M for meaning, and A for accomplishment. "*These five domains can be defined and measured as separate but correlated constructs*" (Seligman, 2012). PERMA model presents a multidimensional structure rather than presenting a single score at a time (Butler et al., 2016).

Research Gap: The review of literature provides an understanding of sentiment analysis, however, there is limited or no literature available on the study of the sentiment analysis of employees working during the COVID-19 pandemic or similar such pandemic in past. This research paper's main objective is to bridge the research gap identified based on the review of literature on the captioned topic for this study.

OBJECTIVES

The main purpose of this study is to:

- To assess the sentiments of employees during the COVID-19 lockdown in India and abroad.
- To assess the emotions of employees during the COVID-19 lockdown in India and abroad.
- To assess the key aspects and relationship if any with the sentiment analysis during the COVID-19 lockdown in India and abroad.

METHODOLOGY

A comprehensive review of the literature on sentiments, sentiment analysis, sentiment analysis tools, emotions

and employees' wellbeing, etc. was carried out to define the scope of the study and ensure its objectivity. The top-cited research papers on the google scholar website were considered for the study. Some key data and trends were taken from leading websites on the topic of study.

Method: The method selected for the study was the descriptive research method. This method describes the attributes of the population from the sample data collected and is used to understand employees' sentiments during the COVID-19 lockdown.

Survey Tool: The tool used for the survey was based on the framework provided by "*The Workplace PERMA Profiler*". Online permission was taken with an undertaking to use the tool for non-commercial purposes (Kern, 2014). This tool has multi-dimension attributes for measuring emotions as positive emotions, engagement, relationship, meaning, and accomplishment, along with loneliness and happiness of the employees. The tool was modified to include a demographic section in the beginning and a provision to collect text comments on challenges and opportunities during this period. Further, for understanding emotions, sentiments, and frequently used words, a tool from paralleldot is used. This tool has free to use Microsoft excel plugin, with a simple interface.

Survey Administration: The population for this survey included all employees working in any organization during the COVID-19 lockdown. This population size is very large and is assumed as infinite population size. The mixed sampling method was followed for this study, where the requisite sample size based on judgemental and snowball methods was used by the researcher. This personally administered survey technique was used considering the pandemic lockdown. The respondents in the professional network were contacted using email, messaging, and social media platforms. Respondents were asked to further request professionals in their network to participate in this survey. The survey was launched on Google Forms. This method had the advantage of higher reach in a shorter time, lower cost of administration, better and ease of administration (Fricker, 2008).

The survey period was open for two weeks and there were 655 respondents in total, of which seven were not employed and were removed. The data analysis was carried out on 648 respondents. Some of the data was re-categorized to make it meaningful for the study. The tools used for processing and analysis were Microsoft Excel 2016, IBM SPSS v26.0 Statistics subscription tools, and Microsoft plug-in from paralleldots for sentiment and

emotion analysis of the free text. This plug-in sentiment analysis tool from paralleldot has APIs that leverage artificial intelligence and natural language processing models that are trained on more than one billion documents and provide the most common NLP use-cases such as sentiment analysis and emotion detection (Text Analysis APIs. n.d.).

Delimitation of the Study: The study is restricted to employees working during the COVID-19 lockdown.

Limitation of the Study: The main limitation of the study was the snowball and purely judgemental survey method that was used due to constraints during the COVID-19 lockdown. It was challenging for the researcher to use a scientific method for sample selection.

Ethics: The purpose of the study was informed to all the participants with a Suo moto consent and with voluntary participation. The confidentiality of the respondent's identity was assured and will always be maintained.

FINDINGS/DISCUSSION

The research objectives were achieved by conducting an appropriate survey, validating the responses, and analysis of the data. The demographic characteristics like country or region of residence, gender, marital status, age bracket, and the type of industry were studied for understanding the profile of respondents.

There were 648 valid respondents for this study, with 84.7% from India and 15.3% from the rest of the world. There were 77.9% male and 22.1% female respondents. Of the total respondents, 78.1% were married while the remaining 22.1% were unmarried, separated, or divorced. There were 21.5% respondents under the 30 years age group, 41.8% in the age group of 30 to 40 years, 25.6% in the age group 40 to 50 years, and 11.1% above 50 years. There were 53.2% respondents from the IT and ITES industry, followed by 15.6% from manufacturing and 8% from the utility sector (telecom, power, and water).

Table 1: Respondent Profile

	Frequency	Percentage	Cumulative %
Country / Region			
India	549	84.7%	84.7%
Rest of World	99	15.3%	100.0%
Gender			

Male	505	77.9%	77.9%
Female	143	22.1%	100.0%
Marital Status			
Married	506	78.1%	78.1%
Other than married	142	21.9%	100.0%
Age Group			
Under 30 years	139	21.5%	21.5%
30 years to 40 years	271	41.8%	63.3%
40 years to 50 years	166	25.6%	88.9%
50 years or above	72	11.1%	100.0%
Industry Type			
IT & ITES	345	53.2%	53.2%
Manufacturing	101	15.6%	68.8%
Utility	52	8.0%	76.9%
Financial Services	43	6.6%	83.5%
Consulting Services	38	5.9%	89.4%
Education	38	5.9%	95.2%
Other Sectors	31	4.8%	100.0%

The data were tested for normality using the hypotheses of the Shapiro-Wilk test:

H0: the variable is normally distributed & H1: the variable is not normally distributed.

The test has Sig value 0 for all the cases, and the null hypothesis was rejected. The dependent variables are not normally distributed.

Table 2: Tests of Normality

	<i>Kolmogorov-Smirnov^a</i>			<i>Shapiro-Wilk</i>		
	<i>Statistic</i>	<i>df</i>	<i>Sig.</i>	<i>Statistic</i>	<i>df</i>	<i>Sig.</i>
Loneliness	0.126	648	0.000	0.917	648	0.000
Happiness	0.160	648	0.000	0.913	648	0.000
Positive Emotions	0.103	648	0.000	0.943	648	0.000
Engagement	0.081	648	0.000	0.962	648	0.000
Relationship	0.129	648	0.000	0.920	648	0.000
Meaning	0.141	648	0.000	0.877	648	0.000
Accomplishment	0.143	648	0.000	0.890	648	0.000

a. Lilliefors Significance Correction

The correlation test result signifies a strong positive co-relation between positive emotions engagement, relationship, accomplishment and happiness.

The correlation of these variables with loneliness signifies an inverse relationship and is on the expected line.

Table 3: Correlations

		<i>Positive Emotions</i>	<i>Engagement</i>	<i>Relationship</i>	<i>Meaning</i>	<i>Accomplishment</i>	<i>Happiness</i>	<i>Loneliness</i>
	N	648	648	648	648	648	648	648
Positive Emotions	Pearson Correlation	1	.616**	.672**	.725**	.695**	.727**	-.250**
	Sig. (2-tailed)		0.000	0.000	0.000	0.000	0.000	0.000
Engagement	Pearson Correlation	.616**	1	.506**	.655**	.640**	.491**	-0.027
	Sig. (2-tailed)	0.000		0.000	0.000	0.000	0.000	0.498
Relationship	Pearson Correlation	.672**	.506**	1	.708**	.702**	.553**	-.203**
	Sig. (2-tailed)	0.000	0.000		0.000	0.000	0.000	0.000
Meaning	Pearson Correlation	.725**	.655**	.708**	1	.886**	.625**	-.208**
	Sig. (2-tailed)	0.000	0.000	0.000		0.000	0.000	0.000
Accomplishment	Pearson Correlation	.695**	.640**	.702**	.886**	1	.619**	-.174**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000		0.000	0.000
Happiness	Pearson Correlation	.727**	.491**	.553**	.625**	.619**	1	-.307**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000		0.000
Loneliness	Pearson Correlation	-.250**	-0.027	-.203**	-.208**	-.174**	-.307**	1
	Sig. (2-tailed)	0.000	0.498	0.000	0.000	0.000	0.000	

** . Correlation is significant at the 0.01 level (2-tailed).

The reliability of responses was established using the Cronbach's Alpha test with a value of 0.907 signifying

the high reliability of the data.

Table 4: Reliability & Scale Statistics

<i>Case Processing Summary</i>				<i>Reliability Statistics</i>		
		<i>N</i>	<i>%</i>	<i>Cronbach's Alpha</i>	<i>Cronbach's Alpha Based on Standardized Items</i>	<i>N of Items</i>
Cases	Valid	648	100.0	0.907	0.923	17
	Excluded	0	0.0			
	Total	648	100.0			

a. Listwise deletion based on all variables in the procedure.

The analysis of the emotional well-being of employees was carried out using the PERMA framework. The analysis shows that respondents from India and the rest

of the world have strong positive emotions. Similarly, respondents from the rest of the world are feeling less lonely as compared to respondents from India.

Free Text Analysis: The free text of the respondents was used for the sentiment and emotional analysis using a combination of tools. Out of 648 respondents, 374 gave no comments and were excluded from text analysis. Of the remaining 274, the respondents from

India have higher positive and neutral sentiments and lower negative sentiments as compared to the rest of the world. The negative sentiments of the rest of the world are higher than the positive and neutral sentiments.

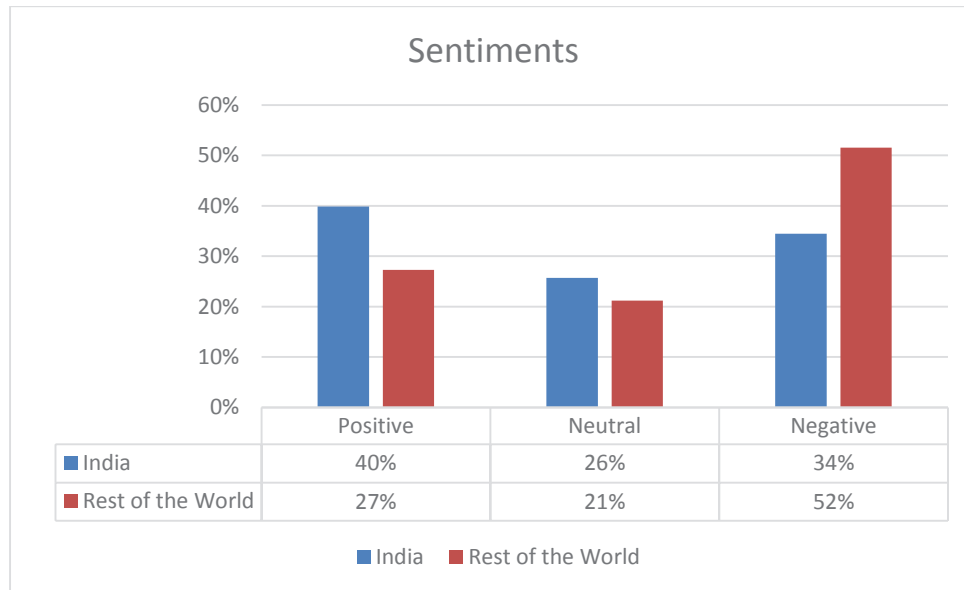


Fig. 1: Sentiment Analysis

The analysis of emotions from free text reveals that the happy emotions of respondents from India are at 13% and for the rest of the world are at 12%, and are almost similar, whereas 42% of the respondents from the rest of the world and 39% of the respondents from India

have excited emotions. 24% of the respondents from India are feeling angry as opposed to 15% from the rest of the world. 18% of the respondents from the rest of the world are feeling sad as compared to 12% from India.

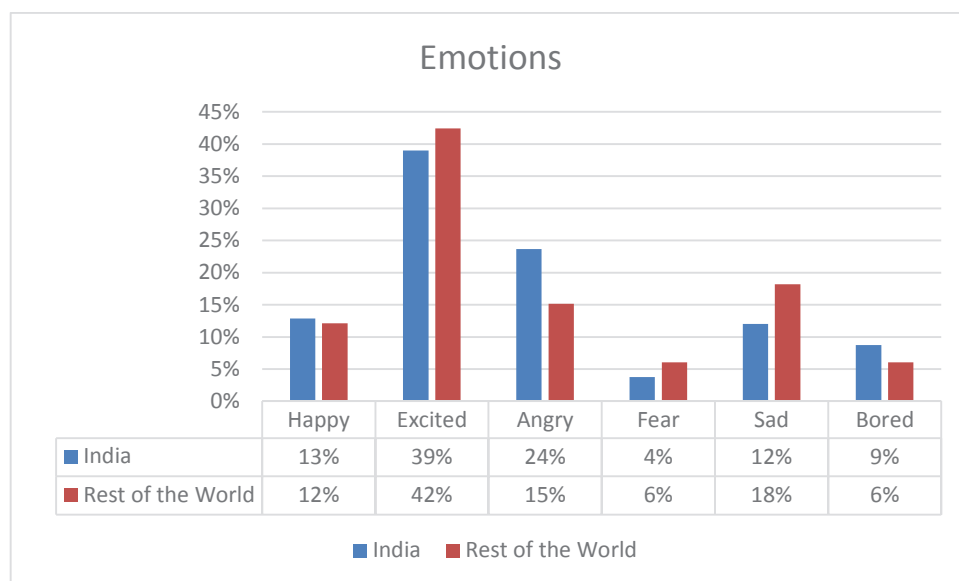


Fig. 2: Emotions Analysis

The sentiment and emotion analysis tool assigns the confidence score between 0 and 1 to each statement. Following are the category wise free-text comments under various emotions from respondents based on the top scores.

Region	Text Statement	Emotions
India	IT people are least appreciated by government although we are handling one of the essential services like telecom, internet and we are working beyond our working hours. No login or logout time is being followed since everyone is WFH.	Angry
Rest of the world	Extended working hours due to working from home.	Angry
India	The weather is hot and by end of the day feel but exhausted while working from home.	Bored
Rest of the world	There should be work from home interspersed with work from the office one or two days a week.	Bored
India	Opportunity. Be simple, values of relationship with family and friends, increase our inner strength.	Excited
Rest of the world	It may lead to new ways of working and many opportunities for business.	Excited
India	Health issues like if someone hospitalized due to non-corona he will not be attended by the hospital as like before corona..	Fear
India	Lock down makes one mentally disturbed.	Fear
Rest of the world	Due to lock down if we want to have any medical checkup it will take time also need to check many parameters like is the cause due to COVID though it's not.	Fear
India	Overall, Very Good, I am happy doing wfh.	Happy
Rest of the world	All Good.	Happy
India	I was looking for onsite opportunity which seems very difficult during this current situation.	Sad
Rest of the world	missing social connect.	Sad

Following are the free-text comments for various sentiments with the top confidence score.

Region	Text Statement	Sentiments
India	Opportunity to learn something new.	Positive

Rest of the World	Material purchase/service/repair/support is one of the biggest challenges amid lockdown. WFH phenomenon emerged as a big success which all together provides a big opportunity to the organization to fine-tune cost/overheads for profit maximization and also provide a better employee experience. Happy employee, a happy client is a win-win situation. It also opened up big opportunities for the service industry like schools, colleagues, dispensaries, etc to switch to an online platform.	Positive
India	Be Safe.	Neutral
Rest of the World	None.	Neutral
India	Internet speeds are slow and a problem .	Negative
Rest of the World	challenges are WFH is good but not along with lockdown.	Negative

The wordle app is used for drawing word cloud from the free text messages. The prominent words represented by the word cloud picture are work, home, opportunity, time, family & challenges.

CONCLUSION

The main objectives of the study were to assess the sentiments and emotions of employees during the COVID-19 lockdown in India and abroad and to study the keywords using word visualization techniques.

The research included examination of various attributes of sentiments and emotions of employees, and the research results provide useful insights into the sentiments and emotions of employees from India and the rest of the world. The results from this study are point in time of the employees who participated in the survey. The outcome of this study should be useful for employers, employees, society, and researchers.

In conclusion, the sentiments of employees working from India are better than those of the rest of the world for both positive and negative sentiments. On emotions, the excited emotions of employees from the rest of the world are slightly better than employees working from India, while the happy emotions of employees from India and the rest of the world are similar. The higher percentage of employees working from India are feeling angry and bored as compared to rest of the world, while this trend is exactly opposite for fear and sad emotions. The overall

emotional wellbeing using the PERMA framework shows better positive and lonely emotions of employees from the rest of the world as compared to employees from India. Some of the prominent words using cloud word visualisation technique are work, home, opportunity, time, family, and challenges.

Recommendation to Employers: Employees have an important role in meeting an organization's objectives and goals. Based on the study of this research, the recommendations are as follows:

On an overall basis, an almost equal number of employees have similar positive and negative sentiments. This is quite different from the emotional well-being of employees, where positive sentiments are higher and employees are feeling less lonely. Analysis from both methods should be used to have a better understanding of employee sentiments and emotions.

Although most of the employees are feeling excited, however a good percentage of employees are feeling angry as compared to feeling happy.

Some employees may need counselling support to overcome negative sentiments and emotions.

The understanding of sentiment analysis from free-text comments using sentiment analysis and word cloud is a useful technique and provides additional insights.

It is recommended to plan regular surveys for understanding the sentiments and emotions of employees, especially during such unforeseen situations.

Recommendation to Employees: The study provides useful insights on the sentiments and emotions of employees, and this can be useful for the self-development of employees and for people managers to understand and support team members.

Further Research: In the current study, the majority of the respondents were from India and that too from the private sector. There is further scope of research on understanding sentiments and emotions of employees, especially for the government sector employees, country-specific, or for a specific industry. Such research can provide good insight and recommendations to the industry.

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