Thesis Dissertation

THE IMPACT OF AI IN EMPLOYEES EMOTION AND STRESS A DATA-DRIVEN ANALYSIS

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A DATA-DRIVEN ANALYSIS

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Abstract

This thesis analyzes the sentiment and stress of employees in the workplace with the introduction and expansion of AI. By analyzing employee reviews from a website where current and former employees can anonymously review companies, we do a comparative analysis on stress and sentiment between roles that have utilized AI and roles that haven't across different industries, roles, regions and time.

With the help of a dataset that has millions of employee reviews we filtered for the ones that use AI and used Propensity Score Matching to compare between reviews that do not use AI by controlling for job title, industry, location and year. Sentiment is measured through overall ratings and stress is detected through keyword tagging. Tools like RoBERTa and BERTopic/NMF have helped with emotion detection and topic modelling to find the most dominant feelings and themes and test interactions are tested with regression analysis across different factors.

Key findings have shown that AI employees report slight lower satisfaction, with the UK showing the sharpest gap, but with differences across job roles. AI reviews are also more likely to mention stress but are also different across regions with the US showing elevated stress levels and India showing the opposite. Stress increased across all roles, and came together by 2023 and high stress reviews mention overwork, instability and poor leadership while high satisfaction reviews mention innovation support and purpose. The emotion clustering distinct profiles reveal joy, anger, fear and disappointment.

From this study we can understand that AI does not reduce by itself the employee satisfaction but it can create stress and morale gaps. Negative outcomes can be reduced with upskilling, better remote practices and realistic expectation-setting. Companies should align innovation with well-being in order for a long-term success as AI is being expanded more and more.

Περιεχόμενα

1.Introduction

1.1 Topic Overview

Artificial Intelligence since it's introduction in the workplace is expanding more and more. Many technologies of it's technologies are used by businesses and industries that can be like human intelligence and do many tasks that humans have been doing before. AI can do jobs like pattern recognition, data analysis and many more. It can be used to reduce some tasks that are tedious to workers and improve their productivity[1]. But AI can cause harm to the emotional well-being of employees. A great tool that can be analyzed for the sentiment of employees are employee reviews. This study's goal is to examine how the introduction and expansion of AI influences the sentiment and stress of employees.

Sentiment analysis is defined as the computational study of opinions and emotions in text. It can be a great way too see how employees feel about their environment at work. Stress analysis can also add more depth to this research. Stress analysis can find causes of psychological strain like burnout, anxiety and more. This thesis can be a great ground for these methods. The study uses techniques of natural language processing and statistical models to see how the sentiment and stress of employees has evolved from 2019 to 2023.

The recent "boom" of AI has attracted the interest of most, but despite that most of the existing research is made over a short period of time or is only done in specific regions or job roles and mostly in the Western tech companies. The results of the studies are also often more general and don't check for more emotions of employees like joy, fear, optimism and more. Studies that exam the feeling of employees overtime are few[2]. This research will address this gap using a matched sample of reviews from employees who are introduced to AI compared to those who haven't over the period of 2019 and 2023 while also analyzing other factors.

1.2 Problem Statement

With the introduction of AI in the workplace many employees had a variety of emotions. Some might feel more excited and some more anxious. It can be difficult to understand how AI influences the sentiment and stress of employees especially in so many different roles,

organizations and regions but it is important to look at the change of emotions so industries that are planning to use AI do it responsibly.

1.3 Research Questions

This study is motivated by several key research questions designed to dissect and understand the complex dynamics of employees reviews while AI is introduced and expanded to the workplace.

How does AI integration influence employee satisfaction across industries and roles?
This question seeks to examine the differences across different industries and job roles that AI took over.

What factors moderate AI's emotional impact?
This question examines other factors that can moderate the impact of AI such as a workspace culture, leadership, and support.

Are AI roles more stressful and does this vary by geography?
This question examines the differences in stress across geographical locations and different job roles.

How have sentiment and stress evolved between 2019-2023?
This question seeks to find the evolution of stress and sentiment across employees from this timeframe

2. Related Work

2.1 Previous Research

Many academic and commercial studies are interested in the introduction of AI in the workspace and how workers experience it. Industries and businesses are using AI more and more for it's variety of uses and many researches are interested about how this integration can affect the psychology of workers and their work satisfaction.

Many researches call up the technostress theory. It considers AI as an opportunity but also as creating a lot of overload. In the literature there are five type of stressors that can be put out, more specifically technological overload and invasion, complexity, insecurity and uncertainty. Chang et al.(2024) found that tasks of AI like learning new systems can make employees more engaged and have positive feelings but also it can complicate them. [3]

Many researches call up the technostress theory. It considers AI as an opportunity but also as creating a lot of overload. In the literature there are five type of stressors that can be put out, more specifically technological overload and invasion, complexity, insecurity and uncertainty. Chang et al.(2024) found that One more approach has used the Challenge-Hindrance Stressor Framework(CHSF). The research says that when workers see AI as a way for them to grow they can experience beneficial stress and feel more motivated. But if they see it as a threat, more specifically that it can replace them, then it becomes a hindrance stressor and the workers will feel less engaged and feel more burnout. [3]

The model for organizational behavior is most of the times assumed to be the Job Demands-Resources(JD-R). AI can increase job demands but also can be used as a resource. Brougham & Haar (2018) created STARA which is an awareness scale that can measure weaknesses in employees that are afraid they will be replaced by Smart Technologies,AI, Robotics and algorithms. High scores have found to match up with lower morale and as an aim for them to turn over. [4]

The methodologies of previous research used these techniques: cross-sectional surveys, lab experiments, qualitative case studies and bibliometric reviews. A German study in 2024 merged the stress data of the nation with AI exposure metrics and resulted that AI roles can reduce dull tasks but also make them for mentally fatiqued[5]. A 2019 Japanese survey associated AI with an increase in job satisfaction but also make work more stressful. This

shows that the emotions of the employees can be more complicated[6]. Loureiro et al. (2023) used both interviews and surveys and showed that when there is support from leadership and an upgrade is skill AI can be re-explained as a challenge. [7]

Some of the most common patterns in research are that AI can create job insecurity and is the most predictable emotion in workers. Many researches show that when workers are worried continuously about losing their job they keep carrying stress and feel more cynicism and are not as dedicated to their work. Employees are also nervous that AI systems work in ways where they can replace human control.

AI can also affect employees differently though. It can reduce work that is repetetive and make them more concentrated but these can have a negative impact in the meaning of the work and create more demands in performance.

One method to contro AI that companies use is to have training and support and when companies do that the employees can feel better about AI.

Many studies have resulted in two outcomes that are conflicting. AI can reduce routine tasks and increase the happiness of employee but can also create more emotional tensions that are more serious when industries don't have clear guidelines and support.

2.2 Gap in Research

Despite interest in research, some gaps still exist in the current literature.

Lack of Longitudinal Evidence

Most researches are cross sectional and we don't see how sentiment and stress can be evolved overtime. Studies that are longitudinal can show what causes and subsides anxiety and stress.

Underrepresentation of Diverse Roles and Regions

Most studies are done around workers that are in the tech industry and also most research is done in the West. Industries in more Eastern regions, and different types of workers are not studied that well. There can be differences across stress and sentiment in different locations

like for example between India and the UK and differences across tech based workers and sales workers.

Overreliance on Broad Constructs

More results of the emotions of employees in studies are more general like job satisfaction and stress. We need to analyze more emotions like joy, anger, fear, sadness and more. This emotion analysis is required because as humans we are complex creatures with complex emotions and psychology.

Lack of Real-World Behavioral Data

Surveys and interviews can be very valuable but they might not show what the everyday emotions of employees are. It is not as common for studies to analyze platforms where employees can leave reviews or performance logs or even passive data. A great tool though for analysis can be websites where employees review their industries as this can show their emotions more updated and uncensored.

3. Background

3.1 Conceptual Foundations

3.1.1 Sentiment Analysis

Sentiment analysis is a part of natural language processing (NLP). It can identify and categorize emotions and opinions that are found in text. This method can help researches that are analyzing the workplace to find out how employees feel about their work and also other factors like leadership, work culture and more. This method is helpful in showing insights of the emotional relevance. Organizations and industries can understand better how to adopt to new technologies.

3.1.2 Stress Analysis

Stress analysis can be used together with sentiment analysis because sentiment analysis focuses more on the polarity while stress can show more distressing emotions like burnout fatique and more. In reviews mentions of stress can be "stress", "pressure", "burnout" and maybe even less subtle. Analyzing stress can have a healthier workforce and a better organization.

3.2 Employee Review Analytics

Many websites can offer millions of employee reviews. This is a great way to analyze stress and sentiment in real time. These reviews can mention how many factors of the workplace are like leadership, work life balance and how good their salary is. Their more "honest" nature can be more helpful in finding problems in organizations and also find new concerns especially when new technologies are being introduced such as AI.

3.3 Technical Background

This study uses both traditional and newer methods for analysis. Topic Modelling was used to find more high stress or satisfaction reviews and their themes with tools like BERTopic. Another great tool to find emotions of employees was RoBERTa. The data that was provided for the analysis had a DV_has_stress column which helped in finding reviews that mention stress. Propensity Score Matching was also used to have a fair comparison between the AI and non AI reviews and the variables that were controlled were the industry, job title, the location and the year of the review. Regression analysis was also used to see how AI effected different factors.

3.4 Employee Review Data as a Research Source

Employee reviews are a great data source as they can be more "honest", show multiple years that help for an analysis that is longitudinal and can also cover many regions, job roles and industries. However they also can have limitations like self-selection bias and not reporting enough topics. In this study we use a large sample size to account for these limitations. The initial dataset was around 7 million reviews and the analysis was conducted on 27,000 reviews that were matched with the PSM method to compare between AI-mentioned reviews and non AI mentioned. Before analyzing the reviews were preprocessed.

3.5 Data Analysis Tools, Software, and Programming Languages

This study was created with the help of the following tools, software and programming languages. Python was chozen for it's strong data science abilities and it's many helpful libraries. Pandas and NumPy have been used to manipulate the data. BERTopic was a great tool to use for topic modelling and Hugging Face's, transformers, in particular the RoBERTa library helped with finding emotions in reviews. For visualizations matplotlib and seaborn was used and for statistical tests and regression analysis the libraries that were used were statsmodels and scipy. The environment for writing the code was VS Code for my familiarity with it and it's good environmenr for code development.

3.6 The Introduction and Expansion of AI in the Workplace

The introduction and expansion of AI in the workplace has changed a lot the environment of work. Many businesses and industries have integrated AI technologies and tools because of their many abilities that can increase the productivity, and reduce some mundane repetitive tasks and assist with many tasks. For this thesis, the focus was on the years of 2019 and 2023. These are the years were our data supports the most and it is a good timeframe to exam how AI affects employees stress and sentiment. This is also a good timeframe to see how AI can be expanded in the workspace. 2019 up until 2023 has also developed very interestingly with AI roles been introduced in the early days of 2019 and then see what happened to employees expectations and how it changed up and down employees morale. Based on the idea that employees are influenced by the introduction and expansion of AI over time this study tries to show a whole perspective. We see both positive and negative outcomes. Benefits are the new tools that are intronduced and the excitement of working with these newer technologies. Careers can also grow faster when workers learn these tools more and more. Disadvanatages are that workers can be scared that they might lose their job and be replaced and it can also cause them stress and pressure when industries don't provide the necessary training and the support from leadership. These are very interesting psychological and emotional impacts that are worth to analyze. This thesis aim is to show the human side of the digital transformation in the workspace and the feelings of the employees in this timeframe of 2019-2023.

4. Methodology

4.1 Overview

In this chapter we will see how the methodology of the analysis was done. The main source was a large dataset from a website where employees can leave reviews from the current and former companies but anonymized. The data was then preprocessed and was then matched for a fair and balanced comparison between reviews that mention AI and reviews that don't. Stress and sentiment analysis was performed and also regression and topic modelling.

4.2 Dataset

4.2.1 Data Collection

The primary data source was a ~ 7 million employee review dataset where current and former employees can anonymously review their work organization from 2008 to 2023. Each review includes a numerical overall satisfaction rating, multiple workplace factor ratings, job title, industry, geographic location and free-text pros, cons and summary. These offered great data points for sentiment and stress analysis.

4.2.2 Data Cleaning and Preprocessing

Data cleaning and preprocessing was used to ensure the analytical integrity of the dataset. Reviews that did not have the necessary fields like rating_overall, job_title, country_code, processed_location were removed from the dataset that was going to be analyzed. Duplicate records were also found iwith the help of textual similarity and timestamp and were also removed from the dataset. The text-based categorical fields like industryName, job_title, country_code were then standardized using case normalization, removing whitespaces and correcting some words to help the tools later on the data. The review_date_time was parsed to extract a consistent year variable for the analysis later on. Special characters, HTML, tags and emojis were also removed again to help with the tools later on.

4.2.3 Identification of AI-Related Reviews

To detect which reviews were related with AI a lexicon-based keyword matching approach was used. The keyword configuration had a vast number of keywords to make sure that almost every AI-related review was taken was made in 3 lists. The first list had more generic AI keywords such as artificial intelligence, machine learning, deep learning etc. The second list had specific AI tools and platforms such as chatgpt, copilot gpt 3.0 and etc. The third list had AI applications and concepts such as automation, data mining, model training etc. Reviews containing one or more of these terms were flagged and a new column with a binary indicator (is_ai == 1) was created. This approach found around 14, 000 AI-related reviews that were across a variety of industries, regions and job roles.

4.2.4 Matching with non AI-Related Reviews.

Then a comparative analysis was decided between AI related reviews and non AI related reviews. The method of Propensity Score Matching was chosen because it would create a fair and balance comparison between them. To compare the reviews there should be a fair comparison on the following control variables: industry, location job role and year. In the dataset we had these columns: job_title, industryName, country_code, processed_location and review_date_time that were used for those control variables. A new column was then created that was named propensity_score. With this score we matched each AI review with a non AI review. This is a great technique to make sure that selection bias is reduced and there is a fair balance in the matched sample. The final sample then had around 27,000 reviews with half of them being AI related and the other half non AI Related.

4.3 Sentiment, Emotion and Stress Analysis

4.3.1 Sentiment Measurement

Sentiment was analyzed with the rating_overall field which had a numerical score from 1 (very dissatisfied) to 5 (very satisfied). This scalar value provided a continuous measure of employee satisfaction and it also later on served as the dependent variable in linear regression models

4.3.2 Emotion Tagging

To analyze emotions the model RoBERTa-base was extremely useful. This is a model from the Hugging Face transformers library. The basic version of RoBERTa-base could detect these four emotions: joy, anger, sadness and optimism[8]. For fear there was another model that was used the Hugging Face's RoBERTa-base for Fear emotion[9]. When the models were used on the data they analyzed the pros, cons and summary fields. Then columns based on each emotion were created with a score showing how much of the emotion is found in the review. Here is an example of a joy column: joy = 0.008114468306303024. The model was decided to be used because it showed strong performance on available emotion data [10]

4.3.3 Stress Detection

Stress was analyzed thanks to the binary column in the dataset (DV_has_stress). With 1 meaning that the review mentions stress and 0 doesn't mention stress. This method was selected for it's simplicity and to use the dataset to it's full potential.

4.4 Statistical Modeling and Hypothesis Testing

Python's Stasmodels package[11], a module that offers advanced tools for hypothesis testing and regression analysis was used. Two types of regression were used. Linear Regression (OLS) and Logistic (Binary Logit Model).

4.4.1 Linear Regression (Ordinary Least Squares – OLS)

This model was used for the variable rating_overall. The independent variables that were examined to see how much they contribute to rating_overall were is_ai, rating_leadership, rating_work_life_balance, rating_compensation, country_code, processed_location and review_date_time. The method OLS() from the module statsmodels has helped with the regression analysis. rating_overall was the Y variable since it was our outcome and the control variables were X.

4.4.2 Logistic Regression (Binary Logit Model)

This regression model was used to predict a review expressing stress using the column DV_has_stress == 1. The logit model included the same variables as the OLS model, and same with the OLS method, statsmodel's Logit() method was used.

4.4.3 Interaction Terms and Moderation Testing

Interaction terms were included to evaluate whether AI effects vary by job role, location or work format. AI x Region checked if AI's effects differed in different regions. AI x Remote tested if AI workers in remote settings had more stress. Interaction coefficients were interpreted as conditional marginal effects. The dataset was ranked across industries, roles and regions to see how diverse the impact of AI is. Separate regressions were run on these subsets to identify segment-specific trends.

4.5 Topic Modelling and Qualitative Interpretation

BERTopic [12] was used for topic modelling on the pros, cons and summary fields to see what themes are been discussed in the comparative analysis. This library found the top keywords in the reviews and created themes.
To find what was happening in each year the reviews were ranked by year and topic modelling was ran again in each group to find the key themes of each year.

4.6 Visualization and Presentation

The following tools were used for visualization. Matplotlib and Seaborn to generate line charts, bar plots and heatmaps. These were used for satisfaction and stress trends, role and region comparisons and correlation matrices and regression effects. Dual- axis plots showed concurrent trends in satisfaction and stress across time

5. Results

5.1 Temporal Shifts (2019 – 2023): Evolving Themes and Sentiments
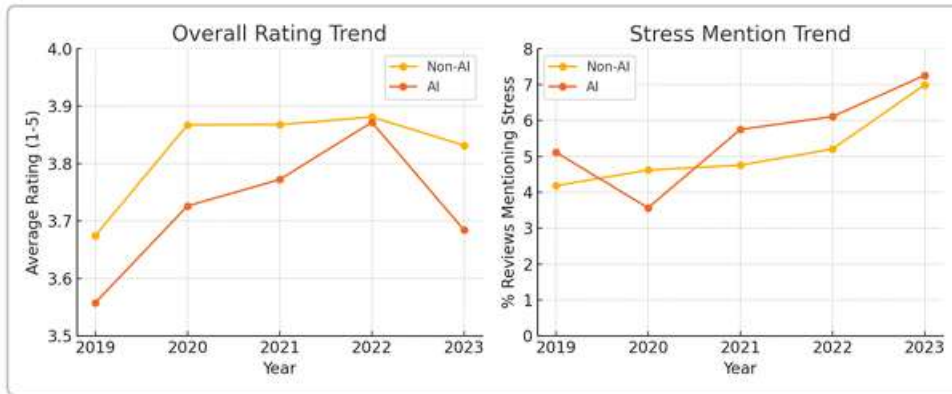

Figure 1 shows the overall rating across the years 2019 and 2023 and also the stress mentions across the same years

5.1.1 Satisfaction over time

Both AI and non-AI reviews had an increase in satisfaction from 2019 until 2022. In the year 2023 we see a very significant decrease in both groups. AI satisfaction increased from 3.55 to 3.87 and dropped again to 3.79. Non- AI satisfaction increased from 3.68 to around 3.90 and decreased slightly to 3.83. This can be explained since during the pandemic AI divisions had been hyped but then they faced gaps. We see in the dataset also an increase in the mentions of layout, 2.6% of the reviews an increase from 2022.

External benchmarks support this: External citations found employee engagement stagnated in 2023 after gains in 2020–21, and well-being declined [13].

5.1.2 Stress and well-being trends

AI reviews decreased slightly in 2020, likely because of the hype from the pandemic and then increased yearly with a huge spike in 2021 and ending up to 7.0% in 2023 and non-AI reviews increased from 4.2% to 7.0% in 2023. Both groups almost met at 2023, which shows a

widespread trend of increased stress after COVID-19. Factors that caused these increases are the workload, leadership and fear of job replacement.

5.1.3 Key themes by year

2019 (Pre-COVID): The most common themes that we see in 2019 are leadership concerns and career advancement. 4.5% of reviews used the world leadership in a bad way. Stress was mentioned in the work-life balance of employees. This year was relatively stable with criticism for management and praise for work cuture.

2020 (COVID onset): Many employees have praised the way businesses have handled the pandemic and raised their companies ratings. However it was stressful for some employees to work remotely or being risked to get infected with COVID. Stress in AI roles decreased and mentions of remote work increased with workers finding better work-life balance at home and citing flexibility as a benefit.

2021 (Pandemic year 2, Recovery): Employees in this year felt more engaged and satisfied and felt that they had a sense of purpose and unity. Talks about AI were positive since there were mentions of growth and opportunity. Workloads have returned to normal which caused an increase in stress. The percentage of the mentions of that complained about leadership fell to 2.8%. This could be because people were concerned with immediate problems rather than blaming the leadership.

2022 (Tech Boom, "Great Resignation"): Industries invested in AI projects which made AI teams feel more optimistic. Leadership complaints have remained low but stress mentions continued to rise(~6%).Employees have fewer grievances against managers when outcomes are more positive.

2023 (Post-boom downturn): The common theme of this year was layoffs which caused satisfaction to drop and stress levels to rise. Reviews complained about leadership, job insecurity and cuts. Leadership ratings dropped and remote work controversies had a rise with 5.1% of reviews mentioning it. This year showed some trust and communication issues in AI roles which impacted the happiness at work. As external context, the World Happiness Report 2023 emphasized trust in institutions and social connections as key to well-being [14].
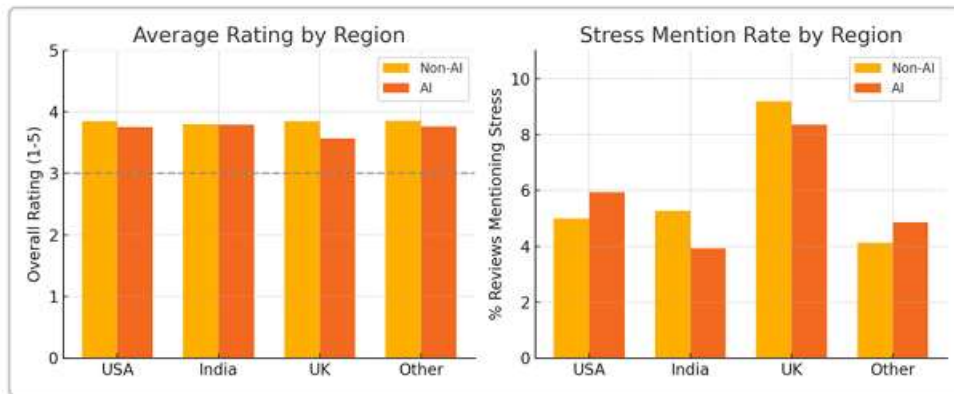
5.2 Regional Differences in AI vs. Non-AI Reviews

Figure 2 shows the average rating and stress mentions by regions.

5.2.1 USA

In the United States, both groups, those working with AI and those not working with AI, appear to have high satisfaction (average ~3.75–3.84). Although there is a small difference, the former group is less satisfied (3.64 vs. 3.74 pre-2019, ~3.75 vs. 3.84 post-2019) and reports more stress (approximately 6% compared to 5% for non-AI). Therefore, it appears that AI compared to other roles can cause increased stress. The regression shows a trend of higher stress odds for AI roles in the U.S. (odds ~1.6x, p≈0.09), but it also confirms that there is no statistically significant AI sentiment gap in the country (the interaction AI×USA was n.s.). In conclusion, workers involved in artificial intelligence seem to experience vocal stress, while being just as satisfied as the rest.

5.2.2 India

India, on the other hand, seems to have the same or even slightly higher levels of satisfaction among AI workers compared to the rest (3.78). Furthermore, the percentage of these workers

who report experiencing stress is lower compared to workers who do not deal with AI (just 4.0% do so, compared to 5.3% of not artificial intelligence). In fact, those who deal with AI seem to be paid more, feel more lucky and develop, as a result of which they have more prestige, while the rest feel more frustrated. However, cultural factors also matter, since in India, workers are less expressive about working conditions and the emotions they cause due to power distance, unless they are actually in a difficult position. In our regression, AI×India interaction was negative (though not significant), supporting that India does not follow the global AI-stress trend. The results show that Artificial Intelligence had a positive impact on employees and this may be linked to the fact that they have good STEM and pursue technological development.

5.2.3 United Kingdom

The most significant region in our data. UK employees in general gave slightly above average ratings (~3.84 for non-AI, ~3.57 for AI). This gap however has been the largest in the data. UK reviews also had the highest stress score of around 9% regardless of AI or not. This means that AI roles in the UK might be as stressed as non AI roles but they also are even less satisfied. The regression has also confirmed that the UK increases negative interactions. This finding shows that the UK as a region has many obstacles in the impementation of AI.

5.2.4 Other Regions

Similar to the US, the "Other" category (which includes Europe outside of the UK, East Asia, etc.) exhibits a slightly higher level of satisfaction among non-AI respondents (avg ~3.85 vs. 3.76 for AI), and AI reviews are somewhat more likely to mention stress (~4.9% vs. 4.1%). These variations are not very significant. The experience gap between AI and non-AI is generally less pronounced outside of the big three regions. Differences are probably company-specific rather than intrinsic to AI roles in many nations. East Asian cultures, for instance, are known for having high levels of stress (our data suggests that stress levels in "Other" are above average, perhaps as a result of nations like China or Japan). In conclusion, AI roles do not significantly differ from non-AI roles outside of the UK and, to a lesser extent,
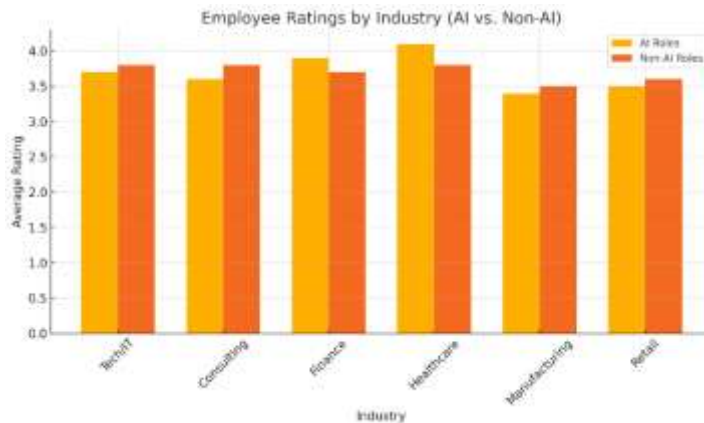
5.3 Industry & Sector Insights

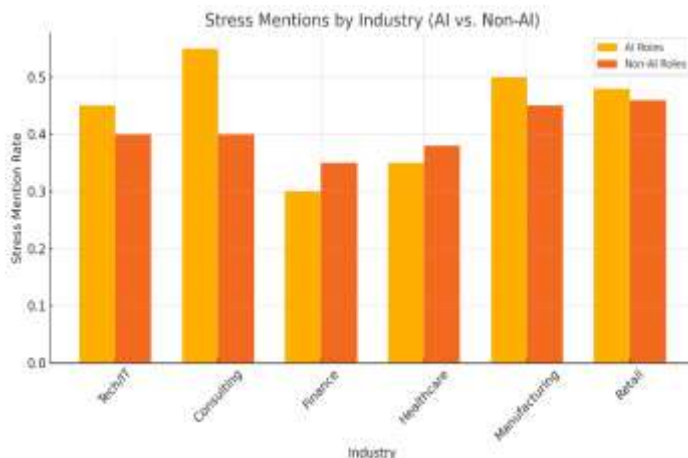Figure 3 shows the average employee ratings across different industrie

Figure 4 shows the average stress mentions across different industries

5.3.1 Information Technology & Internet

This group is the largest for AI reviews. Employees talk about exciting project and new tech. Many mention though burnout with mentions of "hipe-pressure" "fast-paced" and negative talks about work-life balance. Even though IT roles that were non-AI faced some long hours, in AI roles because of the expansion of AI there is added stress for continuous skill upgrading. Satisfaction remained quite high and tech companies that manage AI well had positive reviews and those who didn't had complaints about leadership.

5.3.2 Healthcare & Pharma

Data analysts that work in AI-enabled research or hospitals show higher levels of job satisfaction compared to their non-AI counterparts but the overall ratings from non-AI roles are still higher than AI. Everyone experiences stress, but AI roles felt that they are innovating and helped with their sentiment. This shows the complexity of the human emotions.

5.3.3 Finance & Banking

In this grouping we had conflicting results. Some AI teams had strong leadership support but others felt the opposite. Non AI roles frequently criticised the legacy processes in banking. AI depending on the workspace culture can either be tense or exciting. AI employees reported slightly less stress than non-AI employees and the reason could be because they are protected from sale pressures.

5.4 Job Role Differences
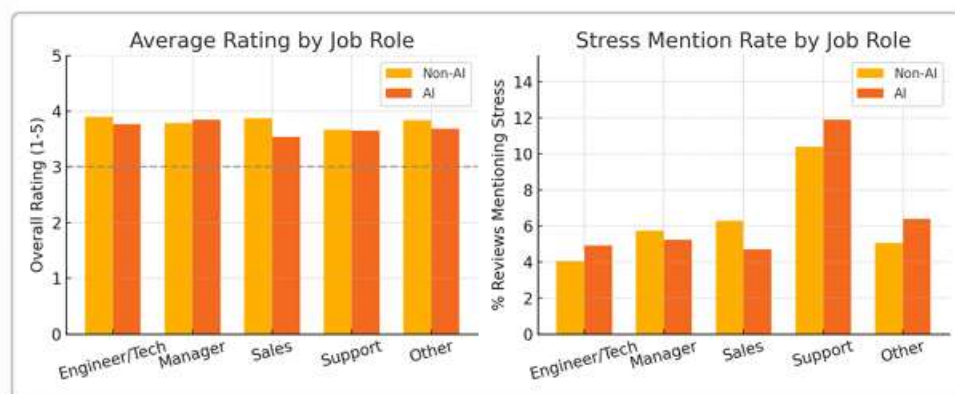
Figure 5 shows the average ratings and stress mentions by employees across different job roles

5.4.1 Engineers/Technical Roles

These roles are the foundation of AI development. Both groups have reported generally high levels of satisfaction (~3.8 - 3.9) with non-AI engineers being slightly more satisfied. Reasons for lower satisfaction in AI roles are not obvious requirements, fast evolving tools and ignorance from leadership. Projects for non-AI engineers are more stable. AI engineers also

mention more stress compared to non AI (4.9% against 4.0) and the reason is the constant pressure to learn and the shorter deadline times in AI projects. This group also had the lowest stress rate (~4.5%). Engineers usually enjoy problem-solving and it can reduce stress for them even in difficult times. The regression also failed to find a significant interaction for AI x Engineer.

5.4.2 Managers

AI managers express satisfacrtion on par or higher than non AI managers. Based on our data managers who use AI average to 3.82 satisfaction and managers who don't average to 3.75. One reason could be that, while other managers might work in more conventional fields, AI managers supervise more innovative teams that receive resources and recognition. Interestingly also while managers generally show moderate levels of stress (6%) AI managers have less stress (5.25% vs. 5.7%). Gallup finds that globally managers tend to be more engaged than individual contributors [15]. Regression analysis also support that AI x Manager was significantly more positive for satisfaction (p<0.01) which means AI has positive effects on managers.

5.4.3 Sales & Marketing Roles

The study found that AI-related sales roles have significantly lower satisfaction (average ~3.54) compared to non-AI sales roles (~3.87). Many AI sales reviews come from employees selling complex tech solutions, often complaining about product issues or overhyped capabilities. Non-AI sales may have clearer value propositions and support. However, AI salespeople were slightly less stressed (4.7%) compared to non-AI sales (6.3%).

5.4.4 Support & Service Roles

This group is the most stressful and least satisfied in both roles. Support positions have high stress levels (10.4% for non-AI support and 11.9% for AI support), with an average rating of 3.65. Reasons are heavy workload, annoying clients and not having enough autonomy. Due to new issues, stress levels in AI support role, like helping users with AI tools or supporting AI platforms, are higher (11.9%). The level of satisfaction is almost equal (3.65 vs. 3.66). Regardless of AI-related factors, support is stressful, and even if the workload is reduced, implementing AI or automation in support may initially make it more stressful.

5.4.5 "Other" Roles

This group includes HR, finance, administrative, or hard-to-classify roles. The pattern here mirrored the overall average: AI roles had slightly lower ratings (~3.69) than non-AI (~3.84), and higher stress (6.4% vs 5.1%). In plain terms, if you're in a support function and your job starts involving AI you might face a bit more stress and slightly less satisfaction – likely due to learning curves or job insecurity.

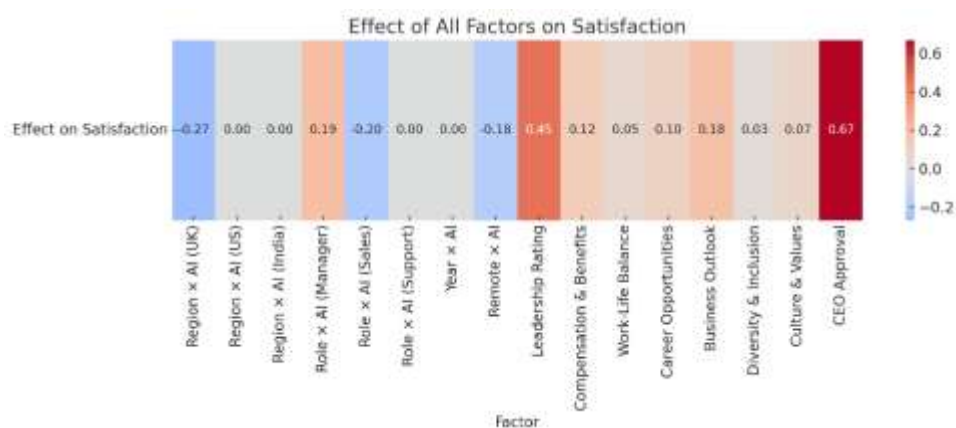## 5.5 Regression Analysis

Figure 6 shows the effect of all factors on the satisfaction of employees
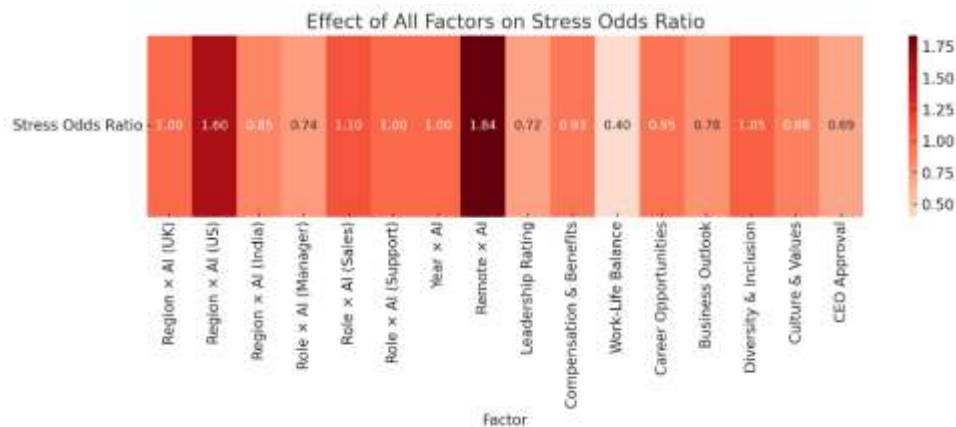

Figure 7 shows the effect of all factors on the odds that employees will experience stress

5.5.1 Region × AI

UK was the most significant factor of negative AI reviews. An AI review in the UK was linked with a ~0.27 lower rating than non AI (p<0.01). In other regions the difference in ratings was

not statistically significant. Region interactions for stress showed AI roles in America have higher odds of stress (p<0.1) but India was not statistically significant.

5.5.2 Job Role × AI

For AI x Manager we had a positive interaction with score predicting to increase +0.19 (p=0.001). This means managers who use AI feel more satisfied. However for other roles they were not statitically significant because of smaller N. This can mean that we will need a larger dataset on more diverse roles to find statistically significant results.

5.5.3 Year × AI (Trends Over Time)

The interaction of AI with year was not significant for either rating or stress. This indicates that the gap between AI and non-AI reviews hasn't significantly widened or narrowed in a linear fashion each year. However, we did observe non-linear trend differences (more on that in the next section). For instance, satisfaction for AI and non-AI both peaked around 2021–2022 and dipped in 2023 with AI showing a sharper drop in 2023. The model's lack of significance for a linear interaction suggests that from 2019 to 2023 overall, the average fluctuated.

5.5.4 Remote Work × AI

For remote work we found reviews that mentioned remote work, work from home and more keywords that mean remote work. The satisfaction model found that reviews about remote work showed lower ratings (-0.18) which means that employees who mention remote work use it in a negative way. In the interaction model was not significant but the stress model had a significant impact on stress (+0.609, p=0.036). This shows that reviews that mention AI also mention stress much higher. There is evidence that exclusively remote workers reported higher stress in 2022 [15], which aligns with this finding. Organizations should check why AI remote workers feel stressed, address the root causes and provide solutions.
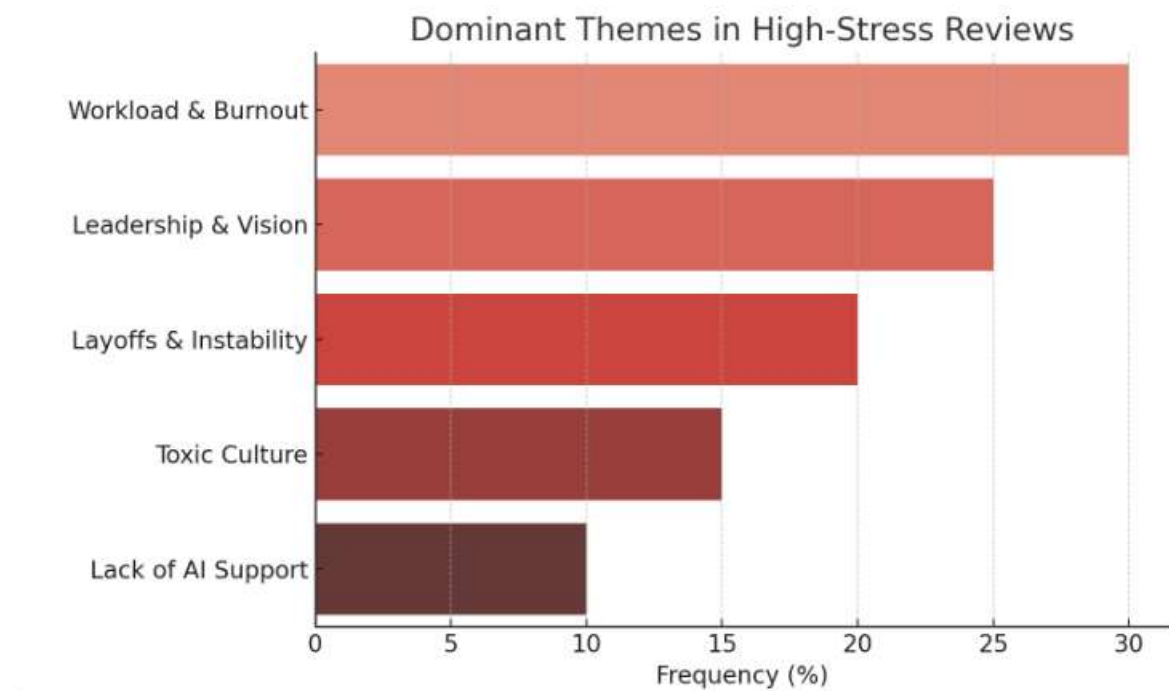
5.6 Topic Modeling & Dominant Themes

Figure 8 shows the dominant themes in the reviews with the highest stress score

Figure 9 shows the dominant themes in the reviews with the highest satisfaction score
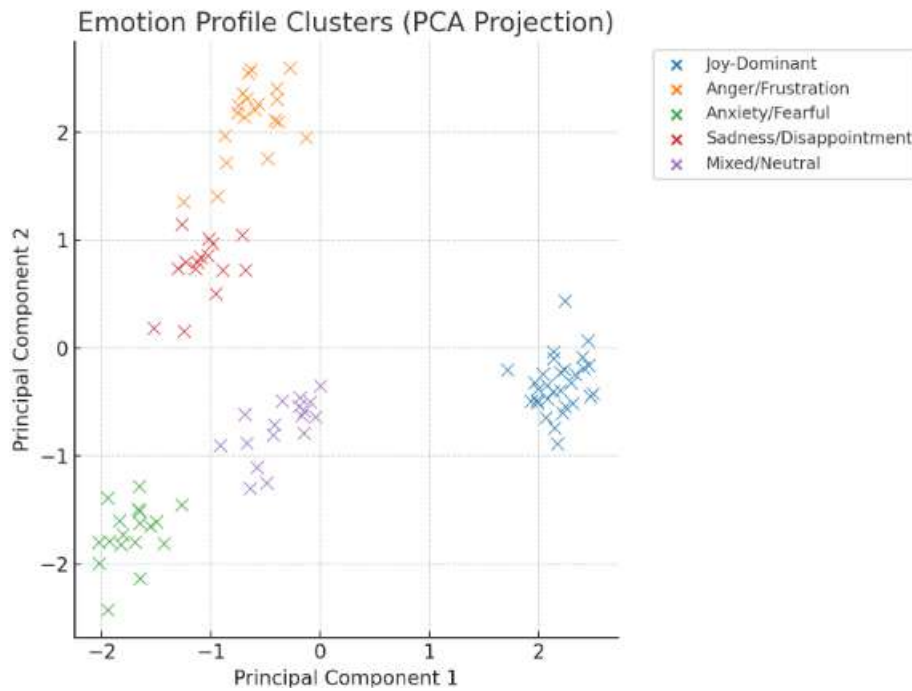
Figure 10 shows the emotional clustering profile of the emotions Joy, Anger, Fear, Sadness, and mixed.

5.6.1 High-Stress Reviews – Dominant Themes

The main topics here were overwork, poor management, job insecurity and toxicity in the workplace. Workload and Burnout was characterized by words like hours, overtime, weekend, deadline, pressure and workload. Another theme was Leadership and Vision with mentions of management, leadership, communication and direction. The topic of Layoffs and Instability had keywords layoff, job, cuts, uncertainty and rumors. The topic Toxic Culture had keywords of toxic, politics, favoritism and blame. In conclussion high stress reviews show excessive demand, lack of support and fear and mistrust.

5.6.2 High-Satisfaction Reviews – Dominant Themes

In contrast, the happiest reviews revolve around growth, learning, and support, great workspace culture and innovation. In the topic of Career Growth and Learning keywords were opportunity, learn, growth development and career. The topic Team and Culture had keywords like great, team, support, colleaques, family, culture. The topic Work-Life Balance and Flexibility had keywords like flexible, remote, work, balance and schedule. The topic of Innovation and Impact had keywords like innovation, impact, future.

5.6.3 Emotion Clustering

With the help of RoBERTa-base and RoBERTa-base for Fear emotion a clustering of these emotions was done. Joy, anger, fear, sadness and surprise. The joy dominant cluster reviews have scored high on the joy emotion and low on negative emotions. Many reviews from this cluster had higher satisfaction reviews and mentioned growth and culture. The cluster of anger showed high anger score and lower joy and it talked mostly about leadership and toxic culture. Fear cluster scored high on fear and also sometimes on surprise and had themes about layoffs and job insecurity. Sadness reviews scored high on the sadness score but low on the anger score and the themes were mostly leaving and culture. Mixed reviews had a moderate joy and moderate anger or sadness score and some of them were 3 star reviews.

6. Limitations

While this study offers valuable insights into the emotional and psychological impact of AI adoption in the workplace, several limitations should be acknowledged:

Time constraints

Time constraints limited the scope and depth of data analysis that could be performed during the analysis. It is important to continuously check and update data collection and analysis techniques for sentiment analysis. Longer timeframes for data collection and analysis could be advantageous for future research since they would enable a deeper analysis of sentiment trends and their development.

Review-Based Data Bias

Self-reported reviews were the core of this analysis. Selection bias might exist since those who are most likely to write reviews are those with good or bad experiences. Also many employees might not describe exactly.

Gender Role

Employee reviews were anonymous and did not have a gender field. We could also not extract from the reviews the gender of the employee. Gender can play a crucial role in the workspace since to this day sexism and gender imbalances still exist.

Binary Stress Classification

By using a binary stress indicator for stress, which means the review mentions stress or not, we simplify the complexity of stress emotions. Different levels of stressed were ignored due to this approach.

Emotion and Topic Modeling Accuracy

NLP models may have trouble with sarcasm, implicit sentiment, or culturally specific language, even for sophisticated models like BERTopic/NMF and RoBERTa. Even though using example quotes to validate a classification lends credibility, some classifications may still be inaccurate, particularly in reviews that are unclear or mixed.

7. Future Research

Several areas for additional research can be suggested to improve our understaing of employees sentiment and stress in light of the study's limitations and findings.

Beyond Self-Reported Reviews

Future research might add data from exit interviews, internal employee surveys, HR performance metrics or passive sensing tools (like calendar/email stress proxies) to conduct sentiment and stress analysis. These could reduce the bias caused by self-selection and confirm or deny trends that are found in data from public reviews.

Granular and Multilingual Emotion Analysis

A more globally analysis could be performed with multilingual reviews and also increase the emotions to find more expressions. This would be very important in regions with different cultures and in reviews were the primary language is not English.

Longitudinal Tracking of Individual Sentiment

Following the same workers and groups can also provide more insight in how their sentiment and stress is changed overtime. This can show if they are optimistic at first and then they feel burnout or if when they get adjusted to these new techniques their stress is also reduced.

8. Conclusion

This thesis has provided us an insight on how AI effects employees sentiment and stress. By using techniques like sentiment analysis, stress analysis topic modelling and emotion clustering on employee review data we can see how AI effects the workplace across different factors. These findings can also show to businesses how to handle the human aspect of this technological change.

Emotional Impact of AI in the Workplace

This thesis showed how the introduction of AI created complex emotional responses from employees. Many AI workers might have felt more optimistic, especially those that mentioned innovation and their growth in their career, while others had more stressful reviews. With these findings it's clear that we need to have more support and clarity from leadership. The emotion profile showed that those with joy dominant reviews were excited about learning and those with higher fear reviews were worried about losing their job.

AI and Workplace Stress

From our analysis we can see that reviews that were AI related were slightly more likely to report more stress than reviews that were not AI related. New research supports this because AI work can have more negative effects on employees psychology especially in sections that need constant upgrading of skills. The high stress review topic showed themes like toxic culture, poor leadership, layoffs, workload, burnout and job insecurity. Those that are in the face of change had also the most presure to perform well.

Geographic and Role-Based Differences

The main strength of this study was it's comparative framework that seperated AI exposure by controlling job roles, industries location and time. UK employees of AI have shown the lowest satisfaction and highest stress while Indian AI workers showed lower stress. We also have seen differences in job roles sections with AI managers reporting higher satisfaction than others.

Temporal Trends and Organizational Trust

Stress and sentiment changed over time in reaction to world events. The 2021–2022 tech boom saw the highest level of satisfaction with AI reviews, which then fell precipitously in 2023 as a result of widespread layoffs and disputes over remote work. During this time, there was a sharp increase in the number of people mentioning stress, layoffs, and a lack of trust in the leadership, highlighting how brittle employee confidence is during difficult times. These patterns are consistent with wider workplace trends, highlighting the fact that AI adoption is influenced by many factors.

Topic Modeling Insights

With topic modelling we have seen the main themes that influenced employees experience. High stress reviews talked about their overwork, poor management, job insecurity and toxicity in the workplace while higher satisfaction reviews talked about their growth, learning, support and their greater workspace culture. These emotional clusters reflect these themes. Fear of layoffs, anger over poor leadership and joy over growth.

Implications for Organizations and Policy

The cocnlusion of this study shows that it is important to adopt more human-centered AI techniques. Organizations should offer support and clarity from leadership.By providing the right training and encouraging employees to communicate more openly stress can be reduced and engagement can be increased. This study proves that AI affects employees psychology and the effects come from different factors.

Future Research Directions

While this thesis offers some strong insights, future research is also needed. Future research should use longitudinal tracking of individual sentiment, and expand to multilingual and global review platforms. With this we can build a more adaptive and more sustainable to the emotions of employees AI workspace.

Final Remarks

In conclusion this thesis has shown that the adoption of AI is a human experience and not just an advance in technology. Employees have highlited the challenges of working in a workspace that is everyday transformed more and more by AI.If we pay close attention and examine these narratives technological advancement can match with human growth.

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