

# **FOUR-DAY WORK WEEK ANALYSIS**

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# **01 INTRODUCTION**

# BACKGROUND

- Four-day work week discussed since 1970s
- Report showed productivity and profits increased with four-day work week with positive employee reaction
- However, it failed to take off
  - Main issue is dealing with the world of five-day work week

Source: [Employee Reactions to the Four-Day Work Week](#)

# FOUR-DAY WORK WEEK GAINING **BIG** MOMENTUM

- Covid-19 pandemic **shifted** workforce perspectives towards work
- According to Adecco Group research
  - Flexible and shorter work week
  - Better work-life balance and mental health

# IDEA OF A FOUR-DAY WORK WEEK

- Work four days a week
- Total of 32 hours
- Earning the same salary and benefits
- Same workload

# COUNTRIES WITH FOUR-DAY WORK WEEK

- Iceland, New Zealand and Japan have shifted to a four-day work week scheme
  - Reported higher productivity and better work-life balance
- Belgium is one of the recent countries that offers employees a four-day workweek as part of its changes in labor laws
- UK started piloting the four-day week in June 2022

# IN SINGAPORE

## 4 of 5 Singapore employees want four-day workweek and flexibility

More than half of the professionals are working beyond the 44-hour workweek standard.

About 88%, or four out of five Singaporean employees, reinforced the push for a four-day workweek with the same pay, a study conducted by Indeed revealed.

Source: Singapore Business Review [article](#) published on Feb 2022



# IN SINGAPORE



65%

Value well-being  
over money

Source: Michael Page The Great X report

# IN SINGAPORE

Firms had rolled out flexible work arrangements including a shorter work week, amid the pandemic. Ministry of Manpower employer surveys show the majority are keen to continue with these, according to Ms Gan Siow Huang, Minister of State for Manpower and Education, in Parliament last month.

It showed that almost eight in 10 workers expect to clock longer hours with a four-day work week. Six in 10 were also worried that with a shorter work week, customers would be left frustrated.

- Employees worried that the four-day work week mean clocking longer hours in a compressed work week
- Company performance affected

Source: The Straits Times [article](#) published on 21 June 2022

# PROBLEM STATEMENT

- Should Singapore join the trend and introduce a four-day work week trial to reduce mental health issues in the workplace and retain or attract talent?
- Ministry of Manpower (MOM) has assigned its data scientists to analyze the data and make recommendations regarding the possibility of a four-day week
  - Examine employee sentiments about a four-day work week
  - Assess whether a four-day workweek would affect the company's productivity
  - Build a model to predict productivity that has at least 80% accuracy
  - Identify the top 3 factors that significantly impact the productivity of the company

# 02 DATA

Overview & Cleaning

# FOUR-DAY WORK WEEK COMPANIES

- Compile four-day work week companies list
- Extract company information from LinkedIn
  - Tenure
  - Number of employees
  - Year founded
  - Company growth rate

# EMPLOYEES' REVIEWS & RATINGS

- Scraped employee review and rating from Glassdoor using Selenium and BeautifulSoup
- Scrapping Challenges
  - Timeout error
    - Overcame by increasing the wait time
  - Webdriver exception error
    - Chrome driver issue
    - Overcame by using the Firefox browser
  - Update code due to revise webpage structure

**FOUR-DAY WORK WEEK  
COMPANIES**

**COMPANY REVIEWS &  
RATINGS**



Combine data  
Drop missing values



95 Companies  
1422 Reviews

# DATA CLEANING

- Replace '4' with 'four'

Caring people doing  
awesome work. 4 day  
work week!



Caring  
people doing  
awesome  
work. four  
day work  
week!



# TEXT CLEANING

- Removal of punctuation
- Convert lowercase
- Tokenization - Split text into a list of words
- Removal of stopword - Exclude words that occur frequently (e.g., with, has, you)
- Lemmatize the word - Reduce the word to its root word

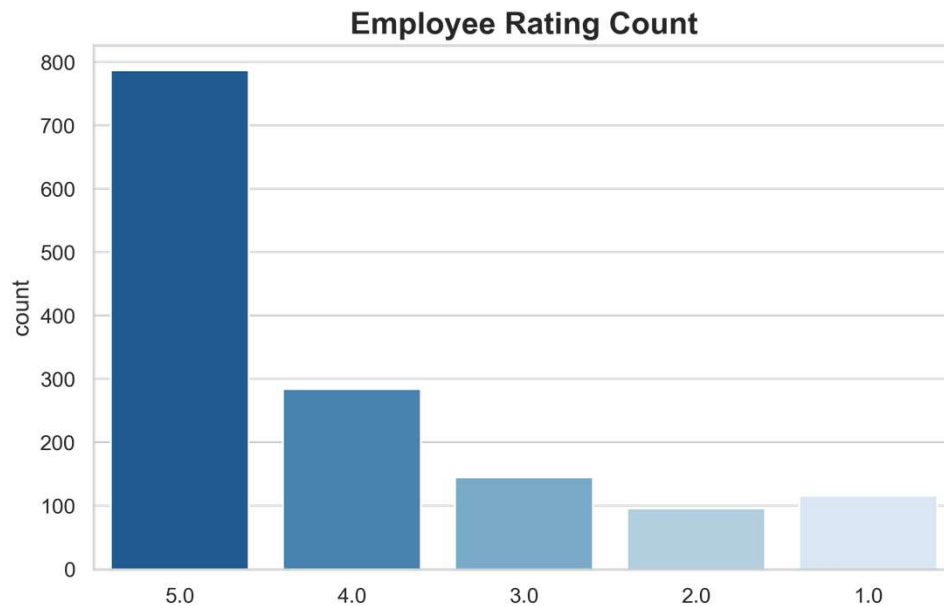
Cares  
Caring → Care

**03**

**EDA**

Employee Sentiment  
Company Productivity

# EMPLOYEES RATED THE COMPANIES AS 5 OR 4



- Happy in the companies they worked in

# EMPLOYEE SENTIMENT



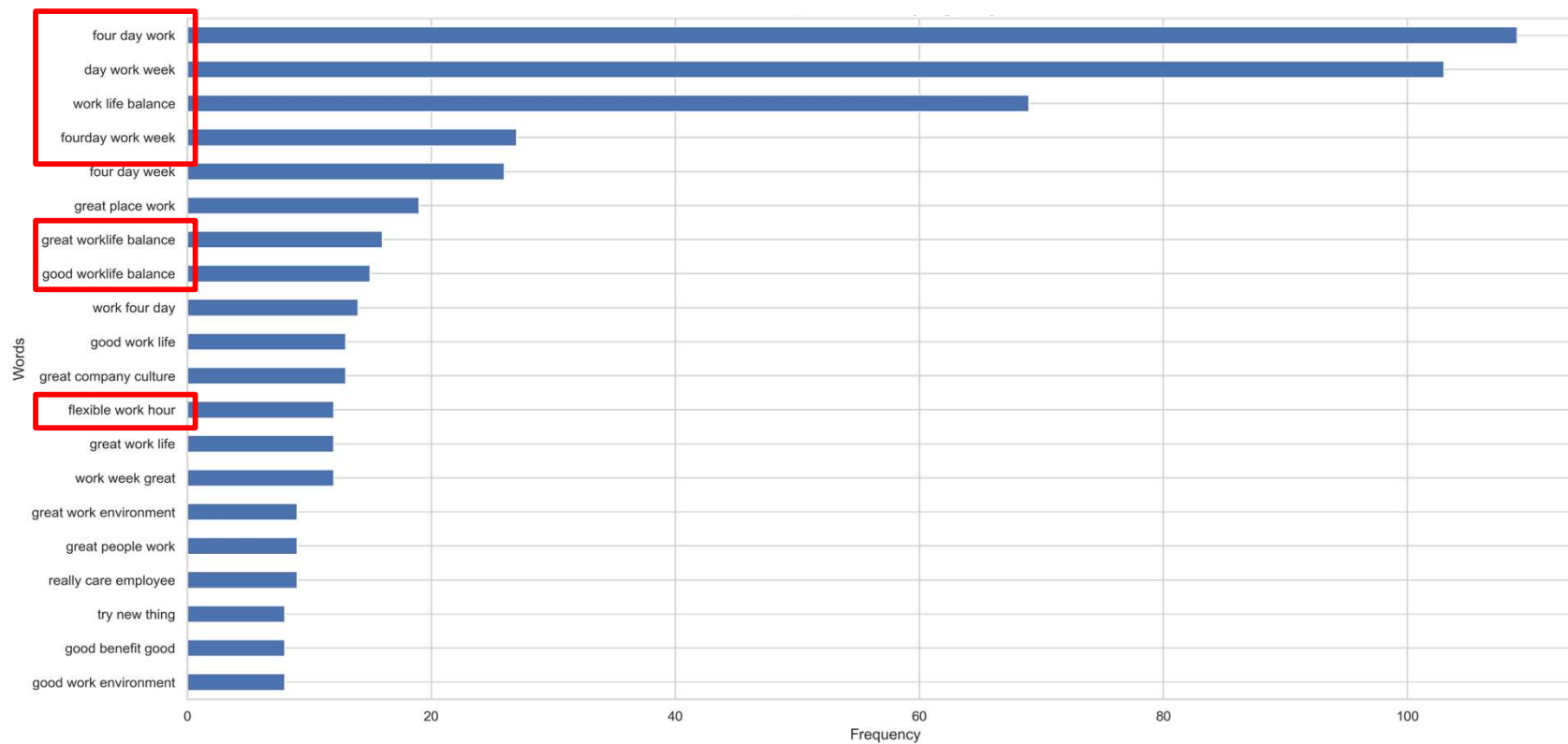
# EMPLOYEE SENTIMENT



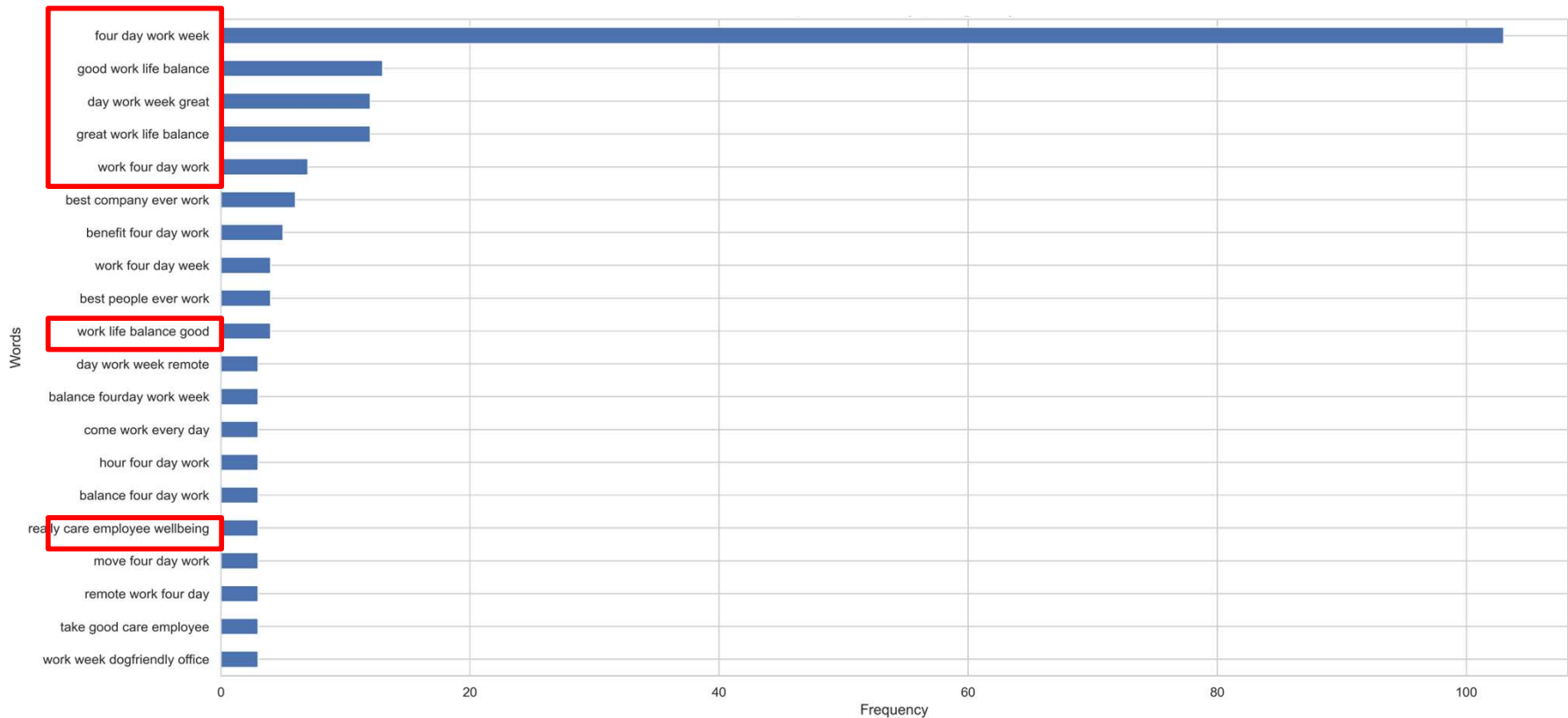
# WORD COUNTS

- Count vectorizer
  - Count the number of word occurrences
- Look at the top 20 words
  - Trigram (3 words)
  - Quadgram (4 words)

# TOP 20 WORDS (TRIGRAM)



# TOP 20 WORDS (QUADGRAM)



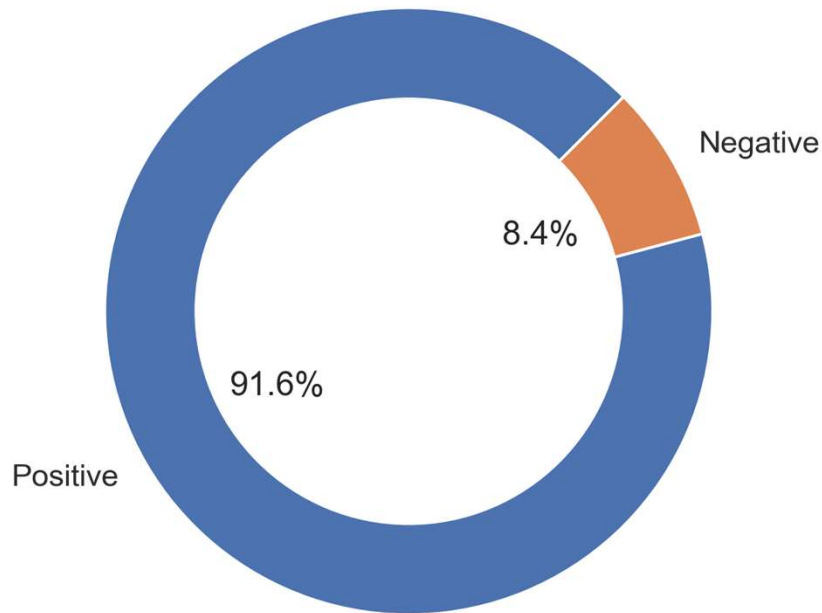


# EMPLOYEE SENTIMENT

- VADER (Valence Aware and sEntiment Reasoner) is a lexicon and rule-based sentiment analysis tool
- Calculates the text emotions and determines whether the text is positive or negative
- Compound score is a metric that sum up all the lexicon ratings which have been normalized between -1 (most extreme negative) and +1 (most extreme positive)

# 91.6% POSITIVE EMPLOYEE SENTIMENT

Sentiment Analysis



- A positive employee experience will lead to:
  - Productivity improvement and better customer service as employee are happy
  - Better mental health
  - Attract better talent
  - Less disruption, less turnover

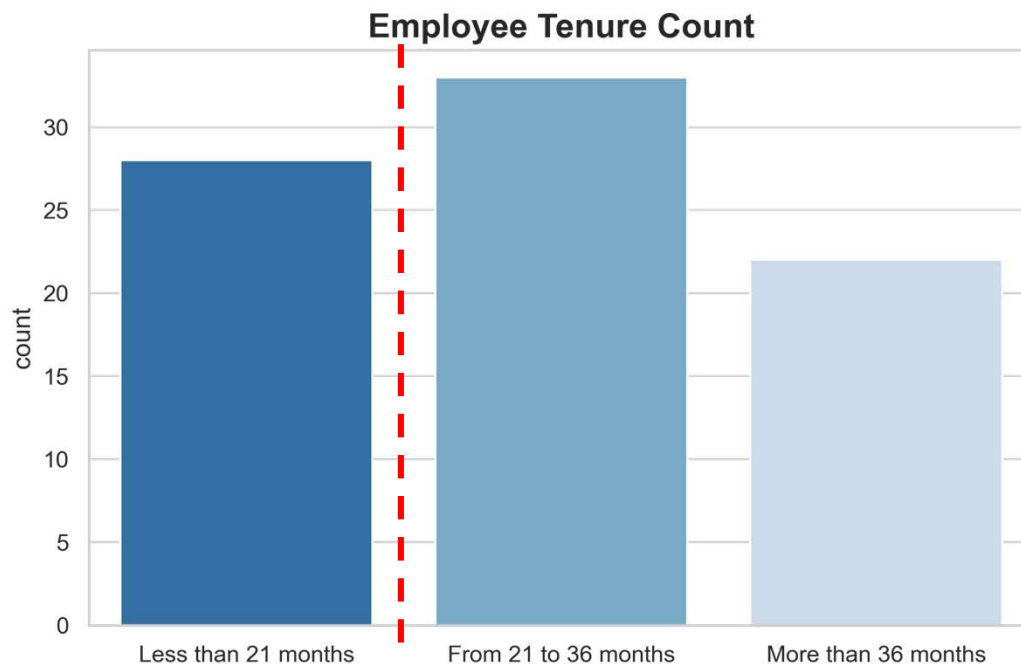
# COMPANY PRODUCTIVITY

- Features adopted:
  - Employee tenure
  - Company lifespan
  - Company growth rate
- Compare data for each feature with industry standard
- The productivity of a four-day work week company is defined as not affected if more than 65% of the companies have comparable or higher data than the industry standard

# EMPLOYEE TENURE

- Length of time an employee works for an employer
- Industry standard : Average employee tenure ~ 21 months
- Categorise employee tenure :
  - Less than 21 months
  - From 21 to 36 months
  - More than 36 months

# 66 % COMPANIES HIGHER EMPLOYEE TENURE



Industry Standard: 21 months

- Turnover rates for four-day work week companies are generally lower
  - Higher productivity is associated with low turnover rates

# COMPANY LIFESPAN

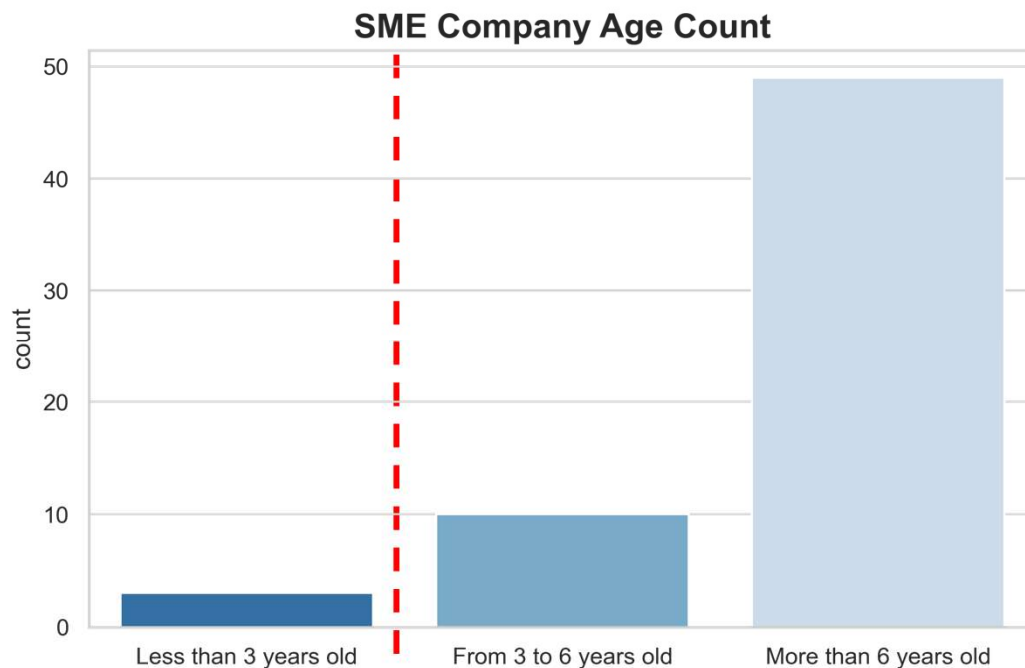
- Industry standard

SME (0 to 249 employees)	3 years
MNC (250 or more employees)	21 years

- Categorise based on company size:

SME	MNC
Less than 3 years	Less than 10 years
From 3 to 6 years	From 10 to 20 years
More than 6 years	More than 20 years

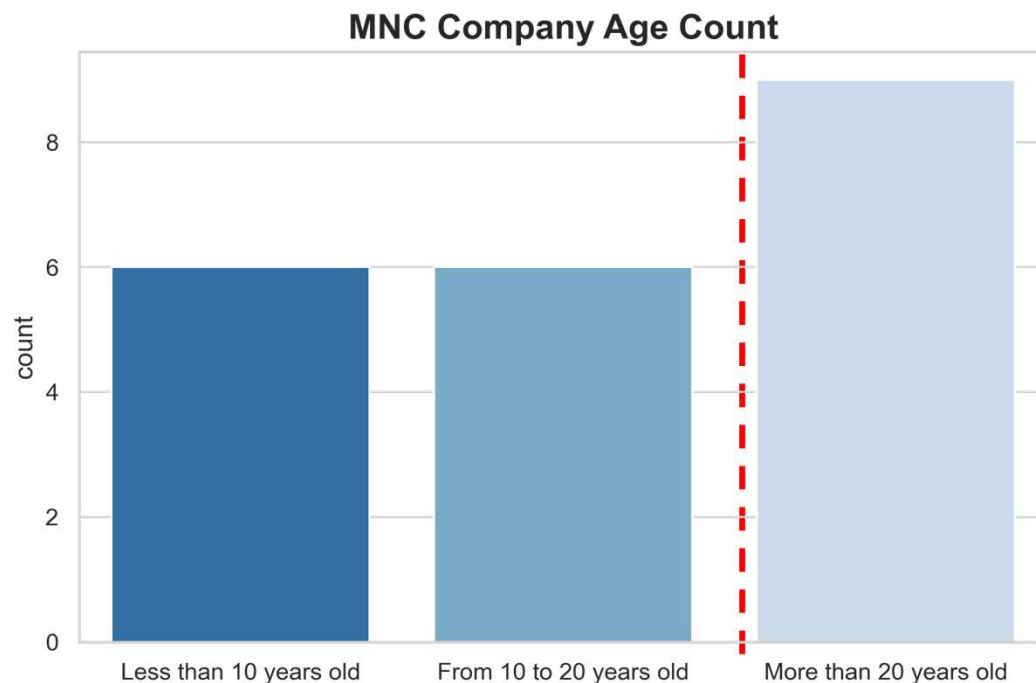
# 95% SME COMPANIES HIGHER LIFESPAN



Industry Standard: 3 years

- Productivity for SME is not affected

# 43% MNC COMPANIES HIGHER LIFESPAN



Industry Standard: 21 years

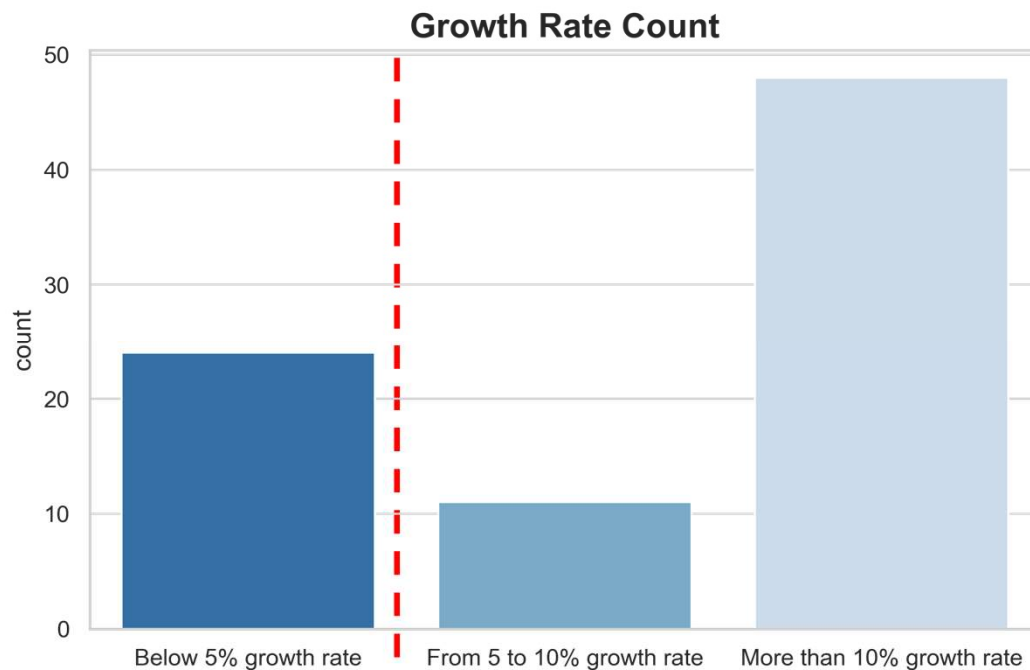
- 9 companies with lifespan higher than 21 years
- May not be as effective in MNC
- May not be conclusive
  - 21 MNC companies (small dataset)



# COMPANY GROWTH RATE

- Measure of growth of company employees over a set period
- Industry standard: 5%
- Categorise company growth rate:
  - Less than 5%
  - From 5 to 10%
  - More than 10%

# 71% COMPANIES HIGHER GROWTH RATE



Industry Standard: 5%

- Four-day work week companies is growing
- Able to attract new talent to join the company

# 04 MODELLING

Using Pycaret

# FEATURES

1. Employee Tenure
2. Number of employees
3. Company growth rate
4. Company lifespan (Age)
5. Company rating

## Target – Productivity

- Productive (Class 1)
  - Compound score is  $> 0.5$
- Not Productive (Class 0)
  - Compound score is  $\leq 0.5$

# MODELING

1. Logistics Regression (Baseline Model)
2. K Neighbours
3. Ridge
4. Random Forest
5. Ada Boost
6. Gradient Boost
7. Extra Trees

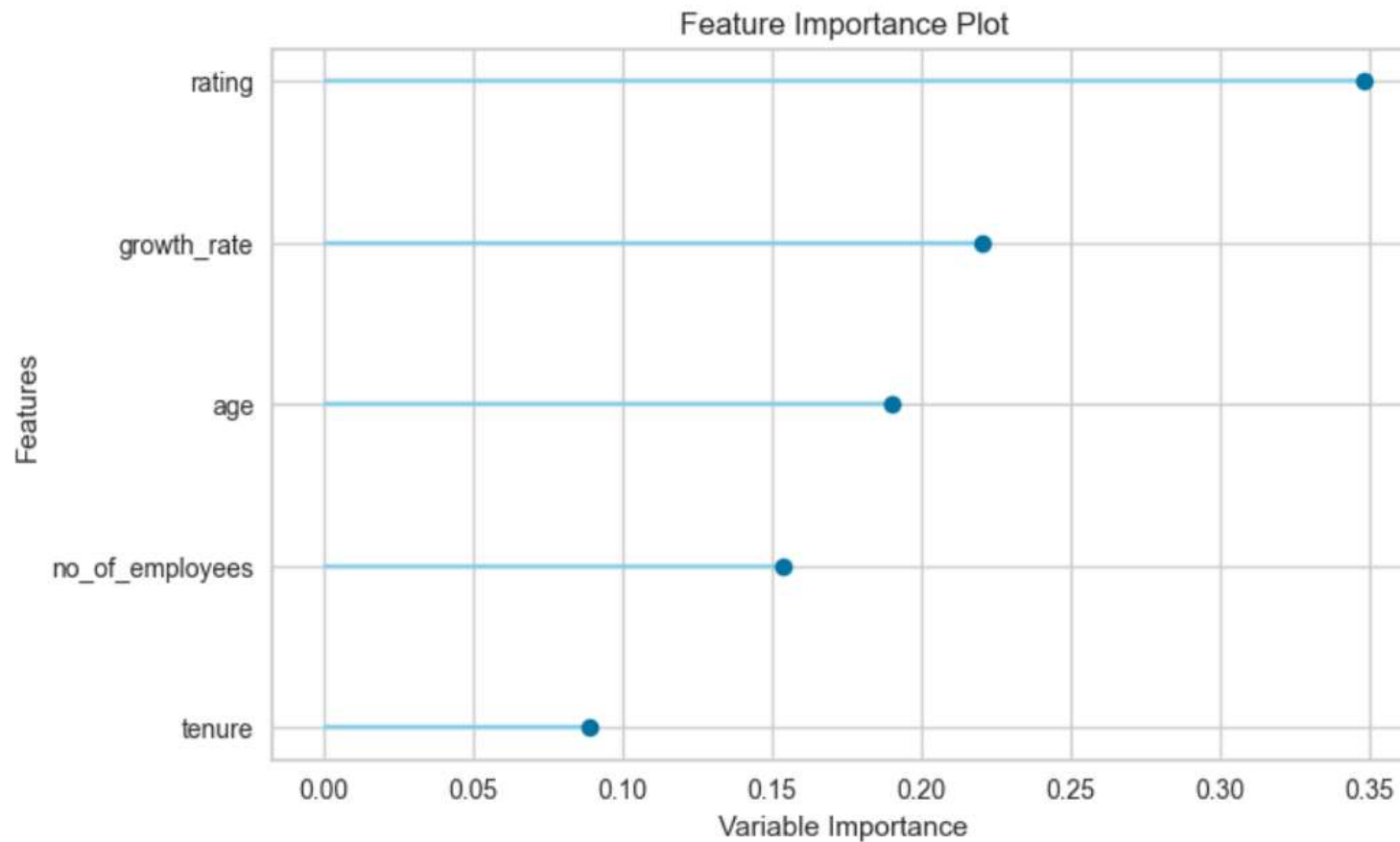
- Metric: F1 score
- High F1 score means model can accurately predict whether company is productive or not

# MODELING RESULTS

Model	Accuracy	F1 Score
Random Forest	0.8600	0.9214
Gradient Boost	0.8233	0.8946
Extra Tree	0.8100	0.8885
Ada Boost	0.8067	0.8853
Ridge	0.7867	0.8676
Logistics Regression (Baseline Model)	0.7367	0.8387
K Neighbours	0.6300	0.7005

- Accuracy for prediction : 0.8125

# TOP 3 IMPORTANT FEATURES



# 05 CASE STUDY

Microsoft Japan

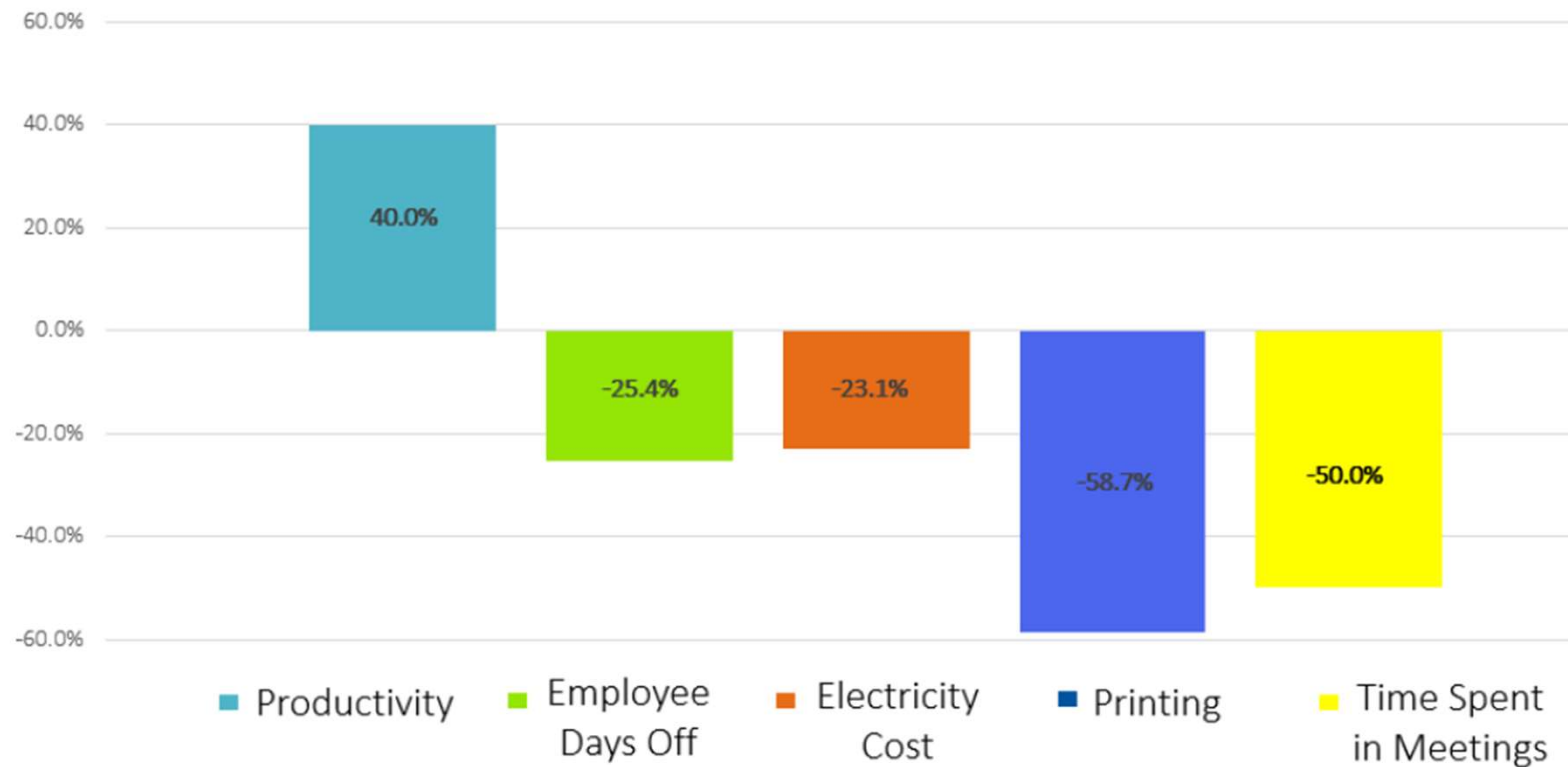


# CASE STUDY – MICROSOFT JAPAN

- Trial in 2019 with the aim to resolve the karoshi (death from overwork) issue in Japan
- Shortened meeting time from 60 to 30 mins
- Inquiries and clarifications done face to face
- Provide support programs that focus on employee self-growth and learning and private life and family care
  - Offered subsidies for self-development activities
  - Provides benefits to employees to participate in leisure travel program with their families

Source: [www.aabri.com/VC2020Manuscripts/VC20032.pdf](http://www.aabri.com/VC2020Manuscripts/VC20032.pdf)

## Microsoft Japan Work Life Choice Challenge Results



Source: Microsoft Japan (2019a)



US MARKETS CLOSED  
In the news

▼ Dow Jones +1.05%

▼ Nasdaq +0.9%

▼ S&P 500 +1.06%

▼ TSLA +1.24%

▲ META -0.76%

[HOME](#) > [NEWS](#)

# Panasonic is the latest Japanese company to break with Japan's workaholic culture and offer a 4-day workweek

Huileng Tan Jan 10, 2022, 12:16 PM

In a bid to improve the country's work-life balance, the Japanese government last June recommended that companies allow staff members to opt for a four-day workweek, the German broadcaster [DW](#) reported.

Source: [Business Insider](#)

# 06

# CONCLUSION

Recommendations, Limitations &  
Future Work

# CONCLUSIONS

- Employees working in four-day work week companies have a high positive sentiment
  - Better work-life balance and mental health cited
- The productivity of a four-day work week company is maintained
  - Lower turnover and attract talent
  - May not be conclusive for MNC companies due to small dataset
- Our recommended model based on the F1 score is Random Forest classifier
- The top 3 features are rating, company growth rate and lifespan.

# TIME FOR A **BOLD** MOVE

- Recommend Singapore to introduce a four-day work week trial with interested companies
- Four-day work week means:
  - 32 work hours
  - Same salary and benefits
  - Same workload

# RECOMMENDATIONS

- Collaborate in partnership with external party on a trial (e.g. 4 Day Week Global)
- To learn from other countries who have successfully implemented the four-day work week (e.g. Iceland)
  - How they have done it and what are their challenges etc.
- Set up a task force to lead and manage the trial for government agencies

# RECOMMENDATIONS – FOR IMPLEMENTATION

- Define the goals and metrics involving both the leaders and employees
- Communicate clearly to both internal and external stakeholders on the reasons for trying out the four-day work week
- Encourage conversations how to implement it successfully
- Have clear qualitative and quantitative metrics to analyze and gain insights from the pilot run
- There is no 'one-size fits all' approach. The task force may need to adapt and customize the approach so that it fit the industry, employees and businesses.



# **LIMITATION**

- Small dataset
- Countries and companies trialed or implemented in recent 2 years
- MNC companies' analysis may not be conclusive

# FUTURE WORK

- Continue to collect more data especially for MNC companies for a more conclusive result
  - Re-train the model to improve its accuracy and F1 score
- Expand the scope of collecting employee reviews from other platforms (e.g. Indeed)
- Assist the task force with analysis needed for reports or decision-making.

**“I am going to give you something that you cannot put a price on, it’s that precious. It’s more time. More time to do whatever you want. And all you have to do is rethink how you do things.”**

**— Andrew Barnes**



# THANKS

Do you have any questions?

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