Summer People Analytics Challenge Insight

Financial Impact of Employee Absenteeism

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Introduction

Absenteeism in this analysis is defined as an employee's absence from work. Excessive and unplanned absences are often correlated with decreased productivity, increased costs, and employee burnout.
According to the Society for Human Resource Management (SHRM), overtime is used to cover 47 percent of employee absences and co-workers are perceived to be 29.5 percent less productive when covering for absent employees.

A reduction in absenteeism can result in cost savings, as well as improved workforce morale and productivity.

Hypothesis:
Unplanned absenteeism is more disruptive and costly than planned absenteeism.

In this analysis, using Orgnostic's sample dataset, I will attempt to:
• Identify trends in absenteeism
• Estimate the cost of absenteeism
• Compare the financial impact between planned and unplanned absenteeism
• Provide solutions for decreasing both the rate and cost of absenteeism

All calculations made in this analysis can be found in the accompanying Excel workbook.

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Data Highlights

Report Range: 1/1/2021 – 6/31/2021
Total Work days: 129
Total Employees: 210
Total Leave days taken: 960

Average Total Absenteeism Rate: 3.54%
Average Planned Absenteeism: 2.30%
Average Unplanned Absenteeism: 1.25%

Basic Cost of Absenteeism: $257,422
Overtime Cost of Planned Absenteeism: $63,021
Overtime Cost of Unplanned Absenteeism: $134,047
Total Cost of Absenteeism: $454,490

Average Cost of Absenteeism per Employee: $2,327.83

Highest Absenteeism Rates by Category		
Location	Germany	10.85%
Department	Sales	5.92%
Team	Leap	10.47%

Highest Costs of Absenteeism by Category		
Location	N/A	N/A
Department	Product & Engineering	$312,420
Team	Data Engineering	$57,351

Highest Turnover Rates by Category		
Location	Poland	28.57%
Department	Customer Experience	33.33%
Team	Support	45.16%

Correlation Between Absenteeism and Turnover		
Category	R^2 Value (Correlation)	Result
All Locations	0.0888	No Correlation
All Departments	0.1555	Very Weak Correlation
All Teams	0.0103	No Correlation

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Methodology

All data used in this analysis came from the following sources:

- Orgnostic's Summer People Analytics Challenge Dataset
- ONET Resource Center (Wage information)

Assumptions:

- 40 hour workweek, Mon-Fri. No holidays.
- Overtime rate is x1.5.
- Leaves are all between Jan 1 – June 30, 2021
- Company-wide **replacement efficiency** of 75%

Definitions:

- **Planned Leave:** Any request for leave that is given with ample time to "plan" for the employee's absence. Absentee's workload is able to be redistributed to the rest of their department.
    - **Planned Leave Categories in Dataset:** Holiday, Paternity Leave, Maternity Leave

- **Unplanned Leave:** Last minute requests for leave that are **not** given ample time to plan for the employee's absence. Absentee's workload is unable to be effectively redistributed to the rest of the department, resulting in higher overtime costs.
    - **Unplanned Leave Categories in Dataset:** Sick, Others

- **Replacement Efficiency:** Percentage of **planned absentee** workload that can be completed by the department without going into overtime.

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Formulas

General Formulas:

Absenteeism Rate: (Total Days of Leave) / (Total Employees) * (# of Work Days)

Average Leave Days per Employee: (Total Days of Leave) / (Total Employees)

Turnover Rate: (Resigned and Terminated Employees) / [(Current Employees + Total Employees) / 2]

Cost of Absenteeism Formulas:

Total Cost of Absenteeism: (Basic CoA) + (Planned Overtime CoA) + (Unplanned Overtime CoA)

- **Basic Cost of Absenteeism:** (Days of Leave) * (Daily Wage)

- **Planned Overtime Cost of Absenteeism:** (Planned Days of Leave) * [1 – (**Replacement Efficiency**)] * (8 hours) * (Overtime Rate)

- **Unplanned Overtime Cost of Absenteeism:** (Unplanned Days of Leave) * (8 hours) * (Overtime Rate)

- **Replacement Efficiency:** Percentage of absentee workload that can be completed without overtime
  - Determined by multiple factors, such as **structure of department** and **skillset of employees**

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Abstract / Key Insight #1

Insight #1: Worst performing teams/departments

#	Team / Department	# of Employees	Absenteeism Rate	Average Cost per Employee
-	**Company-wide Weighted Average**	**210**	**3.54%**	**$2,327.83**
1	**Leap**, Marketing Department	4	**10.47%**	**$7,121.68**
2	**Security and Auth**, Product & Engineering Department	4	**7.36%**	**$6,125.75**
3	**Sales**, Sales Department	22	**5.92%**	**$1,421.35**

Analysis:
- All unplanned leaves were mapped out over 6 months. No significant pattern to unplanned leaves or indications of abuse were found across all departments.
- The Leap team within the Marketing department experienced a significant increase in unplanned leaves in May 2021 and June 2021, following four months without any unplanned leaves. Leap's small team size could be contributing to disengagement.

Action Points:
- Conduct engagement analysis on Leap to identify reasons for the uptick in unplanned leave. More data should be gathered overall in order to build a more robust absenteeism model.
- Consider adding additional employees to Leap and Security and Auth teams to improve engagement and increase flexibility for scheduling

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Abstract / Key Insight #2

Insight #2: Significant negative correlation between planned leave and unplanned leave

Analysis:
- Holiday Leave and Sick Leave were the largest sub-categories of Planned and Unplanned leave respectively.
- Correlation Coefficient (**R**) between the top 10 employees who took the most leave in each category was -**0.8658**.
  - This is considered a strong negative correlation.
  - This suggests that employees who take planned holiday leave are less likely to take unplanned sick leave, and vice versa.

- A 10% increase in Planned Leave and 10% decrease in Unplanned Leave can save an estimated **$7,102.62** in costs .
  - Cost savings can be further amplified by increasing a department's **replacement efficiency**.

Action Points:
- Increase cross-training within departments to enable higher replacement efficiency.
- Encouraging employees to take holiday leave would likely reduce the probability of them taking unplanned leave.
  - As unplanned leave is typically more disruptive to business operations, decreasing unplanned leave at the expense of higher planned leave by the same percentage will likely result in net cost savings.
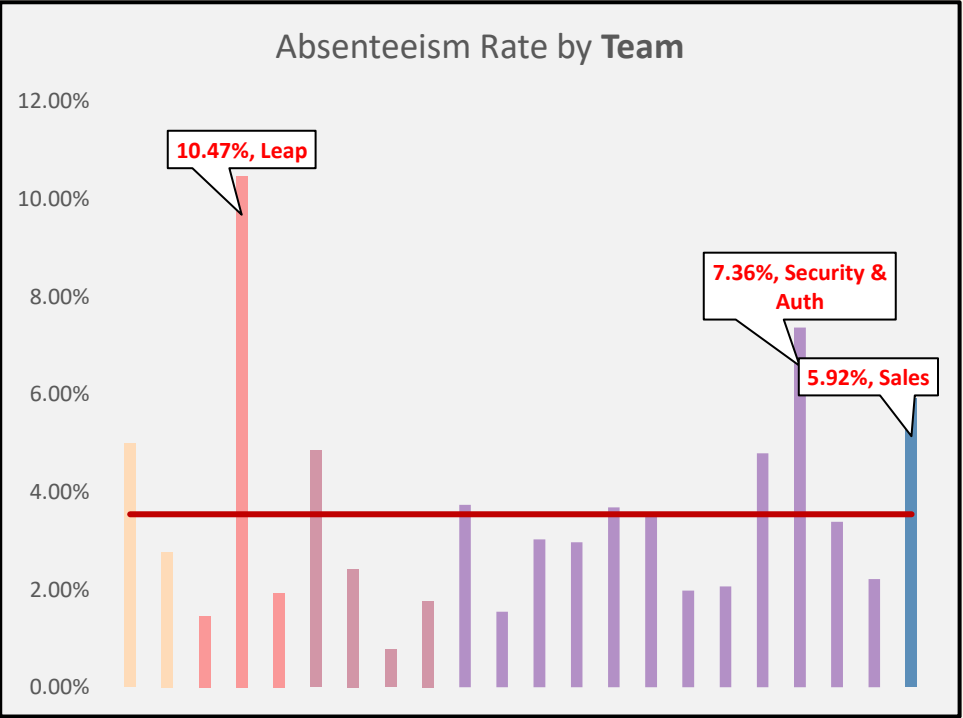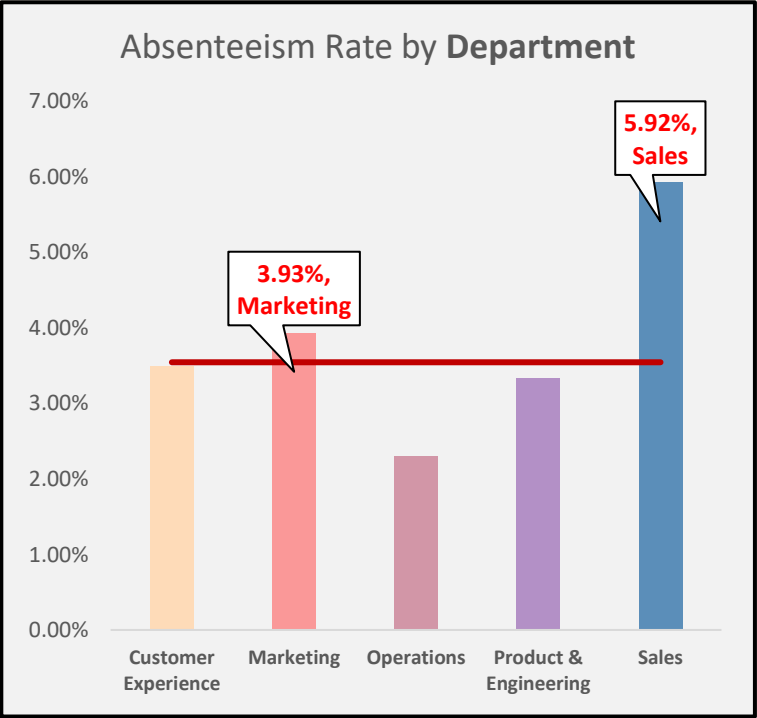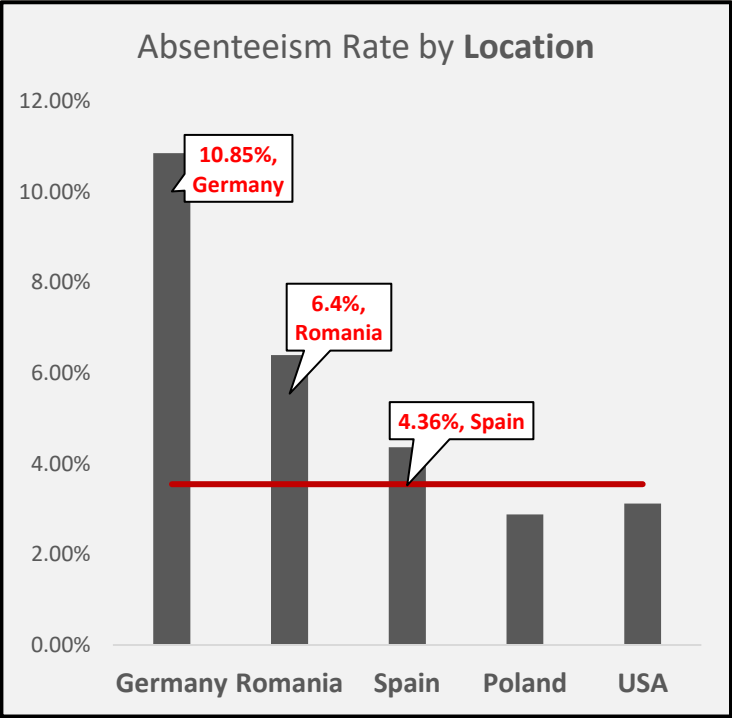
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Cost of Absenteeism (01/01/2021 – 06/30/2021)

Total Cost of Absenteeism: (Basic CoA) + (Planned Overtime CoA) + (Unplanned Overtime CoA)

Department	Team	Employees	Cost of Abs.	Cost of OT (P)	Cost of OT (U)	Total Cost of OT	Total Cost of Abs.	Avg. Cost per Employee
Customer Experience	Success	9	$8,236.00	$2,183.25	$3,621.00	$5,804.25	$14,040.25	$1,560.03
Customer Experience	Support	19	$9,656.00	$1,597.50	$8,094.00	$9,691.50	$19,347.50	$1,018.29
Marketing	Customer Marketing	9	$4,179.28	$1,382.85	$737.52	$2,120.37	$6,299.65	$699.96
Marketing	Leap	4	$13,275.36	$1,567.23	$13,644.12	$15,211.35	$28,486.71	**$7,121.68**
Marketing	Unknown	2	$1,229.20	$460.95	$0.00	$460.95	$1,690.15	$845.08
Operations	Biz Ops	4	$7,180.00	$1,615.50	$4,308.00	$5,923.50	$13,103.50	$3,275.88
Operations	Compliance	8	$6,870.00	$0.00	$10,305.00	$10,305.00	$17,175.00	$2,146.88
Operations	Finance	5	$1,761.20	$660.45	$0.00	$660.45	$2,421.65	$484.33
Operations	Talent Acquisition	7	$3,833.60	$449.25	$3,953.40	$4,402.65	$8,236.25	$1,176.61
Product & Engineering	Activation	11	$10,146.32	$2,369.07	$5,743.20	$8,112.27	$18,258.59	$1,659.87
Product & Engineering	Business Enablement	9	$6,595.20	$2,061.00	$1,648.80	$3,709.80	$10,305.00	$1,145.00
Product & Engineering	Buyer Experience	11	$15,755.20	$1,511.40	$17,587.20	$19,098.60	$34,853.80	$3,168.53
Product & Engineering	Core UX	6	$7,067.44	$2,650.29	$0.00	$2,650.29	$9,717.73	$1,619.62
Product & Engineering	Data Analytics	20	$36,875.20	$12,954.84	$3,493.44	$16,448.28	$53,323.48	$2,666.17
Product & Engineering	Data Engineering	19	$33,769.92	$9,024.72	$14,556.00	$23,580.72	$57,350.64	$3,018.45
Product & Engineering	Feedback	9	$8,427.20	$1,511.40	$6,595.20	$8,106.60	$16,533.80	$1,837.09
Product & Engineering	Foundations	6	$5,862.40	$0.00	$8,793.60	$8,793.60	$14,656.00	$2,442.67
Product & Engineering	Monetization Platform	11	$24,915.20	$6,045.60	$13,190.40	$19,236.00	$44,151.20	$4,013.75
Product & Engineering	Security & Auth	4	$13,923.20	$3,435.00	$7,144.80	$10,579.80	$24,503.00	**$6,125.75**
Product & Engineering	SRE	8	$12,824.00	$4,259.40	$2,198.40	$6,457.80	$19,281.80	$2,410.23
Product & Engineering	Supply Chain	7	$5,928.00	$1,778.40	$1,778.40	$3,556.80	$9,484.80	$1,354.97
Sales	Sales	22	$19,111.68	$5,503.14	$6,654.96	$12,158.10	$31,269.78	$1,421.35
Total			**$257,422**	**$63,021**	**$134,047**	**$197,069**	**$454,490**	**$2,328**

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Unplanned Leave Trends

There does not seem to be any noticeable trend with unplanned leaves that would suggest a significant abuse of the system.

The Leap team within the Marketing department experienced a significant increase in unplanned leaves in May and June, following four months without any unplanned leaves.

This could be a cause for concern, however without more data we are unable to draw any meaningful conclusions.

Unplanned Leaves (Sick & Others)							
Department	Team	January	February	March	April	May	June
Customer Experience	Success	-	-	-	-	17	-
Customer Experience	Support	16	10	2	-	10	-
Marketing	Customer Marketing	2	-	-	-	-	-
Marketing	Leap	-	-	-	-	**10**	**27**
Marketing	Unknown	-	-	-	-	-	-
Operations	Biz Ops	6	-	4	-	-	-
Operations	Compliance	3	-	6	10	6	-
Operations	Finance	-	-	-	-	-	-
Operations	Talent Acquisition	2	-	3	-	-	6
Product & Engineering	Activation	4	-	6	10	-	-
Product & Engineering	Business Enablement	-	-	-	3	-	-
Product & Engineering	Buyer Experience	5	-	11	5	8	3
Product & Engineering	Core UX	-	-	-	-	-	-
Product & Engineering	Data Analytics	4	-	2	-	-	-
Product & Engineering	Data Engineering	-	9	8	-	3	5
Product & Engineering	Feedback	12	-	-	-	-	-
Product & Engineering	Foundations	-	12	-	-	-	4
Product & Engineering	Monetization Platform	19	3	2	-	-	-
Product & Engineering	Security & Auth	-	-	-	8	-	5
Product & Engineering	SRE	-	-	-	-	-	4
Product & Engineering	Supply Chain	-	-	-	-	4	-
Sales	Sales	-	6	26	-	-	7

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Correlation between Sick and Holiday Leave

Holiday Leave and Sick Leave were the largest sub-categories of Planned and Unplanned leave respectively.

Correlation Coefficient (**R**) between the top 10 employees who took the most leave in each sub-category was -**0.8658**.
- This is considered a strong negative correlation

Coefficient of Determination (**R²**) was **0.7495**
- This means that approximately 75% of the data fit the regression model.

Overall, this suggests that employees who take planned holiday leave are less likely to take unplanned sick leave.

As unplanned leave is typically more disruptive to business operations, decreasing unplanned leave at the expense of higher planned leave by the same percentage will likely result in net absentee cost savings.

Most Holiday Leave Days Taken					Sick Days Taken
#	Employee ID	Count (Days)	Department	Team	
1	4068	17	Product & Engineering	Activation	0
2	4031	15	Product & Engineering	Security & Auth	0
3	4052	15	Product & Engineering	Data Analytics	0
4	4064	15	Product & Engineering	Data Analytics	0
5	4036	14	Product & Engineering	Data Engineering	0
6	2011	13	Sales	Sales	0
7	4005	13	Product & Engineering	Data Engineering	0
8	4106	12	Product & Engineering	Data Engineering	0
9	1012	10	Operations	Biz Ops	0
10	2017	10	Sales	Sales	0

Most Sick Leave Days Taken					Holiday Days Taken
#	Employee ID	Count (Days)	Department	Team	
1	2013	16	Sales	Sales	0
2	4121	12	Product & Engineering	Feedback	0
3	1020	10	Operations	Biz Ops	0
4	3012	10	Marketing	Leap	7
5	3015	10	Marketing	Leap	10
6	4010	10	Product & Engineering	Foundations	0
7	4082	10	Product & Engineering	Data Engineering	0
8	4089	10	Product & Engineering	Activation	8
9	5014	10	Customer Experience	Support	0
10	2012	9	Sales	Sales	0

Leave Simulation #1

Parameters:

- 10% increase in planned leave
- 10% decrease in unplanned leave
- 75% Planned Absentee Replacement Efficiency

Result:

- Estimated cost savings of **$7,102.62**

Absenteeism Report Range:	Start Date ↓	End Date ↓	Total Workdays
	1/1/2021	6/30/2021	129

TOTAL EMPLOYEES	210
TOTAL LEAVE DAYS TAKEN	960
Average Total Absenteeism Rate	3.54%
Average Planned Absenteeism	2.30%
Average Unplanned Absenteeism	1.25%
Basic Cost of Absenteeism	$257,422
Overtime Cost of Planned Absenteeism	$63,021
Overtime Cost of Unplanned Absenteeism	$134,047
Total Cost of Absenteeism	$454,490
Average Cost of Absenteeism per Employee	$2,328

Total Cost of Absenteeism: (Basic CoA) + (Planned Overtime CoA) + (Unplanned Overtime CoA)

Cost of Absenteeism Simulator
Used to simulate cost changes after adjusting absenteeism rate

Planned Absentee Replacement Efficiency: % of absentee workload that can be completed without OT	75.00%
Change in Planned Leave (Select from Drop-down menu)	10%
Change in Unplanned Leave	-10%
New Total Cost of Absenteeism	$447,387.66
New Overtime Cost of Planned Absenteeism	$69,323.36
New Overtime Cost of Unplanned Absenteeism	$120,642.70
New Average Cost of Absenteeism per Employee	$2,282.15
Estimated Change in Cost:	**= $7,102.62**

Leave Simulation #2

Parameters:

- 10% increase in planned leave
- 10% decrease in unplanned leave
- 85% Planned Absentee Replacement Efficiency

Result:

- Estimated cost savings of **$9,623.47**

Absenteeism Report Range:	Start Date ↓	End Date ↓	Total Workdays
	1/1/2021	6/30/2021	129

TOTAL EMPLOYEES	210
TOTAL LEAVE DAYS TAKEN	960
Average Total Absenteeism Rate	3.54%
Average Planned Absenteeism	2.30%
Average Unplanned Absenteeism	1.25%
Basic Cost of Absenteeism	$257,422
Overtime Cost of Planned Absenteeism	$37,813
Overtime Cost of Unplanned Absenteeism	$134,047
Total Cost of Absenteeism	$429,282
Average Cost of Absenteeism per Employee	$2,210

Total Cost of Absenteeism: (Basic CoA) + (Planned Overtime CoA) + (Unplanned Overtime CoA)

Cost of Absenteeism Simulator
Used to simulate cost changes after adjusting absenteeism rate

Planned Absentee Replacement Efficiency: % of absentee workload that can be completed without OT	85.00%
Change in Planned Leave (Select from Drop-down menu)	10%
Change in Unplanned Leave	-10%
New Total Cost of Absenteeism	$419,658.31
New Overtime Cost of Planned Absenteeism	$41,594.02
New Overtime Cost of Unplanned Absenteeism	$120,642.70
New Average Cost of Absenteeism per Employee	$2,152.91
Estimated Change in Cost:	**= $9,623.47**

Conclusion:

Based on the absenteeism cost model used, lower unplanned leave at the expense of higher planned leave by the same percentage would result in net cost savings of **$7,102.62**, assuming a replacement efficiency of 75%. Net cost savings can be further increased to **$9,623.47** by increasing overall replacement efficiency to 85%.

- The **Cost of Absenteeism Simulator** can be found on the Dashboard sheet of the accompanying Excel workbook.

Action Items:

- Encourage employees to take planned leave to reduce the probability of them requiring unplanned leave.
- Increase cross-training within departments to enable higher replacement efficiency. This also increases the department's scheduling flexibility.

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Thank you!

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Links

1. **Dummy Dataset** ➤

2. **Analysis Calculations, Cost of Absenteeism Simulator** ➤

3. **ONET Resource Center (Wage data)** ➤

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