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PSM Engineering Management

Data Analytics for Engineering Managers

STEP 1: Ask a Question

1. Does workplace safety training has an effect in reducing the number of Occupational safety related accidents in Manufacturing/High Risks companies?

   Benefits: Understanding the co-relation between the increase of safety training of people and accident rate is beneficial for both the company and the employees, especially for those aiming to be certified for ISO 45001:2018. It can be beneficial for the organization's management as the results can justify investments on costly safety training programs by showing potential reductions in accidents, downtime, medical cost, and legal liabilities (DOLE). For employees, safety trainings can mean a more safety and healthy work environment that can lead overall job and career satisfaction. It can help in making a more data-driven decisions to improve both operational efficiency of an organization and as well employee's wellbeing.

2. Most appropriate is the descriptive analysis as it will be relying on historical data of past training records and accident reports prior having it, and identifying correlation, patterns, and trends.

Ho (Initial Hypothesis) – Organization that support and conduct more comprehensive safety training programs will have lower workplace incident/accident rates compared to companies who doesn't prioritize or no safety training at all.

STEP 2: Determine the Data needed.

1. Possible Data Elements:
    - Value of workplace incident/accidents annually
    - Type and Severity of accidents – Minor, Major, Near Miss
    - Frequency of training sessions – Annual or semi-annual, once
    - Type of safety training (Work at height, construction safety, LOTOTO etc)
    - Number of employees per company
    - Type and risks of industry sector (High risks, low risks, Manufacturing)
    - Compliance with Safety standards (OHSAS, NIOSH, DOLE, ISO 45001)

2. Potential Data Sources:
    - Safety Agencies, Government Labor, BWC and DOLE (Accident/incident statistics)
    - Publicly available safety and incident report of companies
    - Industrial safety reports
    - Academic journals and case studies on occupational safety
    - ILO (International Labour Organization) and DOLE Safety databases
    - Personal datasets from personal audited organization as an auditor of ISO 45001:2018 from a certifying body
    - Kaggle datasets related to workplace accidents and safety (See sample databset below gathered from kaggle)

REFLECTION QUESTIONS:

1. Why is it important to identify the question that needs to be answered by the analysis before beginning the project?

It is important since it will ultimately define the purpose and the direction of why data analysis and the project will commence at the first place. A clear question will help data analyst and engineers to determine what relevant data are needed to answer the specific question and what appropriate analysis can be performed. Also, a well-defined question will help on being efficient throughout the project and can provide meaningful insights or support in effective decision making.

2. Name some sources of open data for analysis that you found while searching for your data elements. – Reliable and data set of occupational health and safety statistics are abundant online, and some if it are as follow:

Government and Institutional Safety Publications available online. (including but not limited to)

- https://www.ilo.org/sites/default/files/2024-10/National-OSH-strategy-initial-profile-Philippines-2023.pdf
- https://ecc.gov.ph/wp-content/uploads/2015/04/2014_OSH.pdf

Workplace Injury and Safety Datasets on Kaggle (including but not limited to)

- https://www.kaggle.com/datasets/jboysen/injured-workers
- https://www.kaggle.com/datasets/snehilsanyal/construction-site-safety-image-dataset-roboflow
- https://www.kaggle.com/datasets/ihmstefanini/industrial-safety-and-health-analytics-database