Module 1 Assignment Project –

Singapore Jobs Analytics

NANYANG TECHNOLOGICAL UNIVERSITY SINGAPORE | Centre for Professional and Continuing Education

SkillsFuture Career Transition Programme (SCTP)

Advanced Professional Certificate in

Data Science and AI

Get the Skills, Tools and Mindset to Kickstart Your Tech Career

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Approach

1. Learn by 'reverse engineering'
2. Cross-check codes and results with information from classroom sessions
3. Break and rebuild
4. Identify best practices
5. Log everything for easy recall

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Business Case – IT Sector

Business Scenario

- Singapore's IT sector is entering a structurally tight labour phase driven by sustained digitalization, AI adoption, cybersecurity demand, and platform engineering expansion.
- Outlook – Continued expansion but constrained by skilled-talent availability rather than job creation.

Objectives (mid-term)

- Offset labour scarcity by shifting firms toward automation, AI-assisted development and high-value work.
- Strengthen conversion from training → employability → job performance in advanced technical domains.
- Ensure Singapore remains an attractive hub for technology investment and high-value digital jobs

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Business Case – IT Sector

Target Group

- IT Firms (including SMEs)
- Skills and Workforce Development

Actionable Steps

- IT Firms
  - Build internal talent pipeline; Reduce reliance on external hiring
  - Prioritize deep technical capability over headcount growth; Invest in AI / Automation
  - Job Redesign
- Skills and Workforce Development
  - Drive the implementation of IT / AI / DevOps / Cloud skills frameworks and transformation
  - Drive cross-border / cross-continent expertise initiatives

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Business Case – IT Sector

Business Value Proposition **(if objectives met)**

- IT Firms (including SMEs)
  - Stronger innovation capability → higher productivity → wage growth → retention
  - Greater resilience to labour shortages
  - Great potential for sustainable high growth

- For Singapore -
  - Stronger digital and innovation ecosystem → Continued attractiveness as regional tech hub
  - Sustained IT sector growth → long-term competitiveness against global tech centres
  - Productivity-led wage growth → reduced reliance on external talent
  - Higher value job creation

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Business Case – IT Sector

Business Value Proposition **(If objectives are not met)**

- IT Firms (including SMEs)
  - Erosion of growth and competitiveness within the industry local and overseas
  - Chronic hiring shortages → Increased outsourcing or off-shoring
  - Reduced productivity and wage stagnation

- For Singapore -
  - Digital competitiveness decline → loss of regional tech leadership position → reduced attractiveness for tech investment
  - Greater reliance on foreign specialized labour → impacting local labour market
  - Limiting economic growth

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Data Handling and Process

Tools used:

- DBGate
  - Data cleaning
    - Removing columns that are not needed for the dashboard
    - Validating the datatypes for each column and modifying them if required

type	name
="VARCHA	Filter
VARCHAR	employmentTypes
VARCHAR	positionLevels
VARCHAR	postedCompany_name
VARCHAR	salary_type
VARCHAR	status_jobStatus
VARCHAR	title
VARCHAR	sector

type	name
="INTEGEI	Filter
INTEGER	metadata_repostCount
INTEGER	metadata_totalNumberJobApplication
INTEGER	minimumYearsExperience
INTEGER	numberOfVacancies
INTEGER	salary_maximum
INTEGER	salary_minimum
INTEGER	average_salary

type	name
="DATE"	Filter
DATE	metadata_newPostingDate
DATE	metadata_originalPostingDate

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Data Handling and Process

Tools used:

- DBGate SQL (DuckDB)
  - Data cleaning

- ChatGPT and Python
  - Vibe coding and troubleshooting

- Huggingface
  - Web Hosting – https://sofian75-dsai-module01-assignment.hf.space/ (Public)
  - Reverse engineering method of learning code

- Github
  - Storing of deployed codes (including back-ups)
  - https://github.com/DSAI-Sofian/6m-data-coaching-wk3-assignment (Public)

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Core Assumptions

1. # of vacancies is a valid proxy for employer demand i.e. postings reflect real hiring intent

2. Total job applications are used as a proxy for available labour supply i.e. applications reflect genuine, qualified jobseekers

3. Talent Shortage Index used as a blend of:
   - Demand intensity (vacancy volume)
   - Supply tightness (vacancies relative to applications)

4. Salary Represents Market Price for Labour
   - Salary bands assumed to reflect different labour strata
   - Band boundaries are fixed and may not perfectly match real labour market segmentation across sectors.

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Biases

1. Supply-Side Bias
   - High-application sectors may appear less tight even if skills mismatch exists.

2. Demand Duplication Bias
   - Sectors with repeated or persistent postings may appear to have stronger demand.

3. Salary Reporting Bias
   - Incomplete salary disclosure can skew median salary calculations.

4. Sector Aggregation Bias
   - Aggregating diverse roles within a sector may mask internal shortages or surpluses.

5. Normalization Bias
   - Min–max normalization compresses mid-range sectors and exaggerates extremes.

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"... the keys to my success is a clear and consistent understanding of my own limitations."