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

Module 1 Assignment Project – Singapore Jobs Analytics

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

Module 1 Assignment Project – Singapore Jobs Analytics

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

Module 1 Assignment Project – Singapore Jobs Analytics

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

Module 1 Assignment Project – Singapore Jobs Analytics

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

Module 1 Assignment Project – Singapore Jobs Analytics

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

Module 1 Assignment Project – Singapore Jobs Analytics

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

Module 1 Assignment Project – Singapore Jobs Analytics

Data Handling and Process

Tools used:

- ChatGPT
  - 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)

Module 1 Assignment Project – Singapore Jobs Analytics

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.

Module 1 Assignment Project – Singapore Jobs Analytics

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.

Module 1 Assignment Project – Singapore Jobs Analytics

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