1.0 Assumptions for this report

The data used in the analyses are gathered before COVID-19 and the date of the analyses is set in the last quarter of 2019. The personas are completely fictional.

2.0 Persona 1

2.1 Description

Dr André Petit, aged 68, is the recently appointed Health Minister of France. With an education background in Public Health and Law, Dr Petit has a diverse career background as a lawyer, senior advisor to government and state-run hospitals, and senior consultant to major healthcare companies for more than 40 years. Although Dr Petit's expertise is in a relatively text-heavy domain, he has developed his own ways of visualising information to better outline and understand the issues.

Inspired by the Pandemic Crisis Action Plan by the US (Executive Office of the President of the United States, 2018) and some domestic health system issues (Chevreul et al., 2015), the French Prime Minister requested Dr Petit to lead reforms in the French healthcare system to enhance its resilience if health crises occur.

His predominant tasks during his term would be to 1) evaluate the rigidness of the French healthcare system, to gain insights on how susceptible the system would be when encountering unexpected health crises; 2) identify key issues in the system and, subsequently, suggest strategies to improve the system; and 3) appropriate funds to assist the strategy execution. With the key goals in mind, Dr Petit would be interested in the three data visualisation questions below.

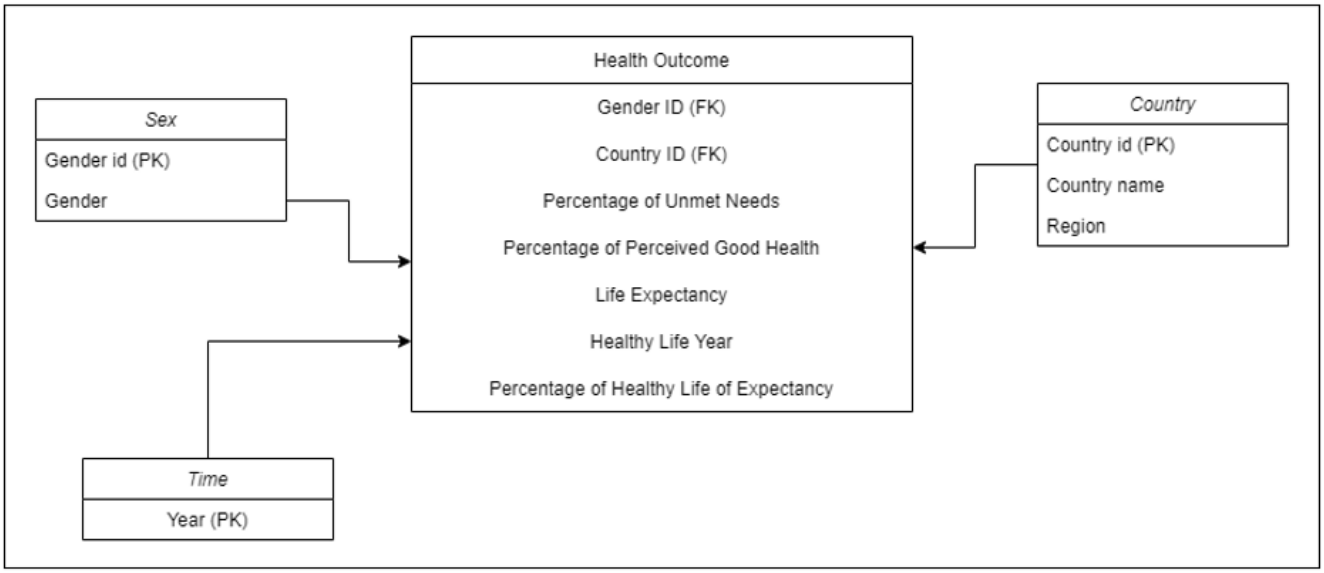
2.2 Questions

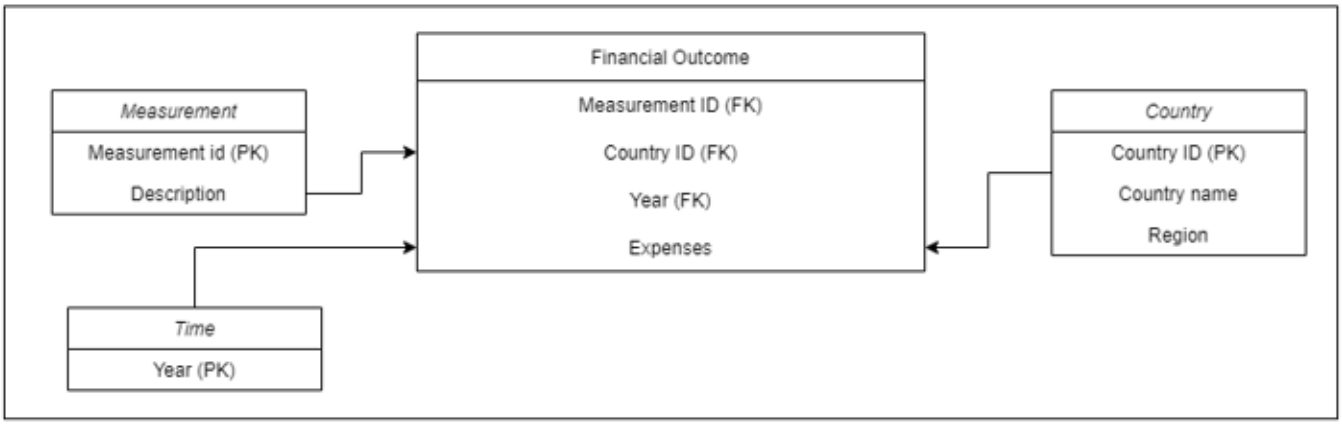
Q1: What is the quality of life of the French compared with other countries?

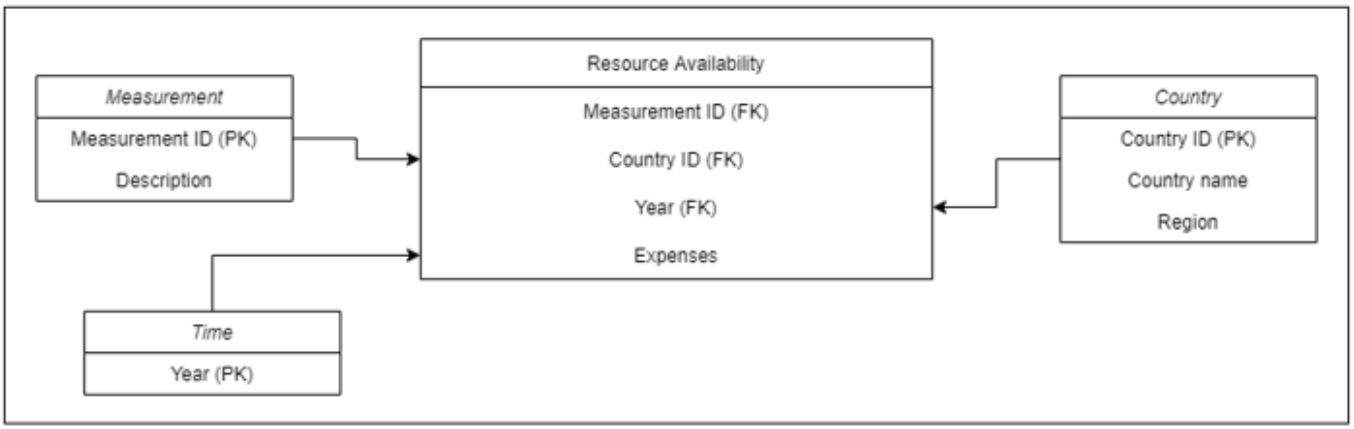
Q2: How is healthcare spending changing over time compared with others?

Q3: Is the French healthcare system equipped with adequate medical resources when encountering unexpected and serious public health crises?

2.3 Dimensional Models





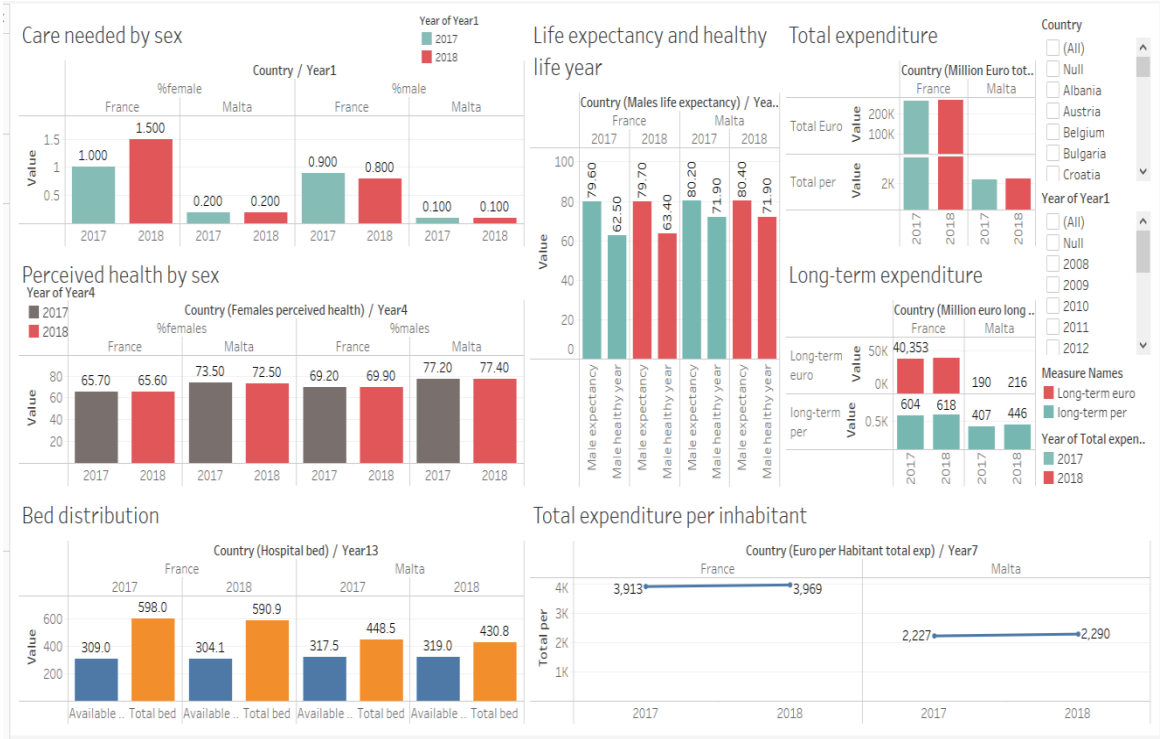


2.4 Tableau Dashboard

In determining the French quality of life, Dr Petit can look to the visualisation of the overall health status. This provides insights on how healthy the average citizens are, the current domestic demands for healthcare services, and whether there are any widespread long-term health issues.

To monitor government spending on healthcare, the dashboard enables Dr Petit to focus on data regarding long-term diseases and total expenses. If costs for long-term disease expenses are abnormally high, this would suggest that long-term diseases are widespread and improved support is needed. On the other hand, if total expenses increase dramatically while the long-term expenditure remains constant, it may indicate an occurrence of urgent health crises, requiring immediate responses.

If Dr Petit wants to learn about the resilience of the French healthcare system against acute health crises, the dashboard directs him to data on the proportion of available beds in hospitals by comparing sheer quantities of total and available beds for resource availability. The higher the proportion is, the system is less resilient.



(Screenshot of the Tableau Dashboard for Persona 1)

3.0 Persona 2

3.1 Description

Melanie Simpson is a 40-year-old CEO of an American healthcare resources company. Originally from Australia, Melanie did her undergraduate studies at the University of Sydney, studying a Bachelor of Commerce and Laws. Melanie started her career as a management consultant, where she led projects within the healthcare sector. Melanie then pursued her MBA studies at the Harvard Business School, where she graduated as a Baker Scholar. Melanie then joined our firm as the Head of Corporate Development. After working for three years in the role, she was promoted to the COO role, before moving to the CEO role last year.

Her time as a consultant within the healthcare sector has helped her gain an in-depth understanding of the industry. Melanie also has extensive networks and connections gained from her time in management consulting and business school, which will greatly assist her when executing the firm's growth strategies.

Her tasks involve building and overlooking the strategic goals and long-term vision of the company. Her tasks involve managing the day-to-day operations of the company and making sure that it is using its people and capital effectively. Her role also involves implementing advice from the board of directors.

Melanie's goal is to guide the company to become an international powerhouse within the healthcare resources industry. Her goal is to expand to Europe within the near future, with global healthcare capabilities in the long term. To be able to make the decision, Melanie needs to answer the following questions.

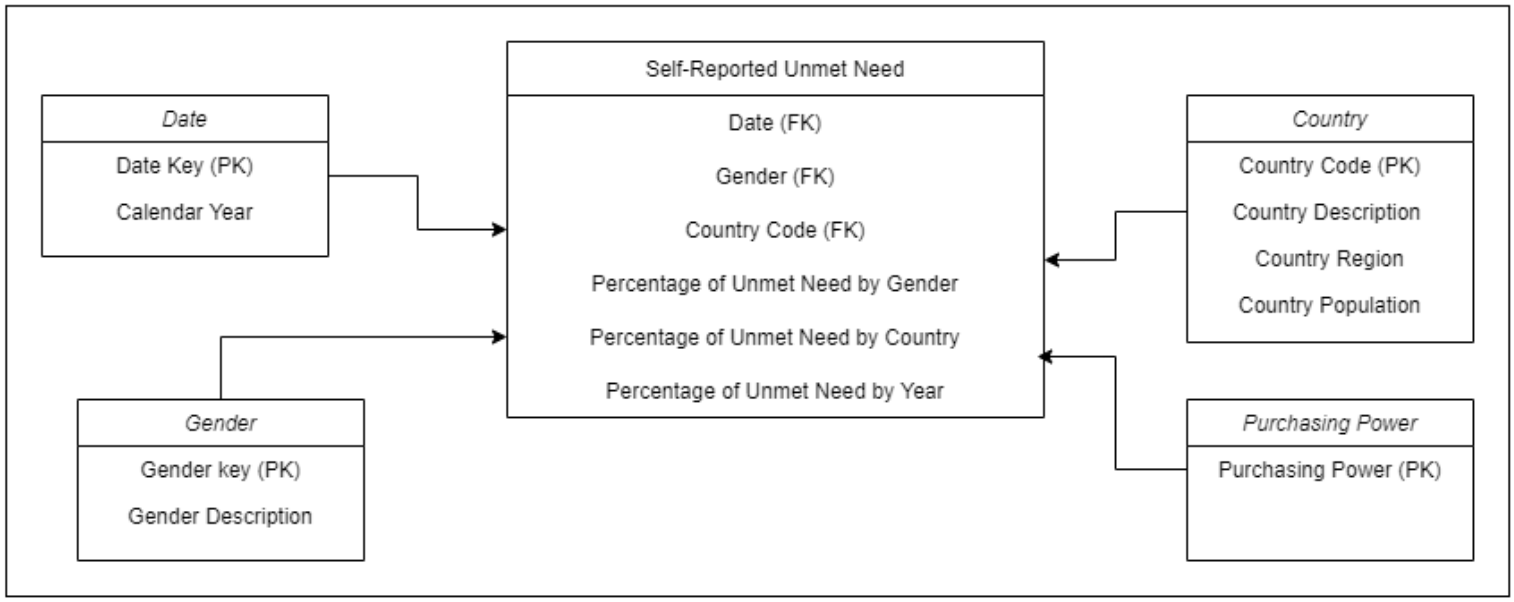
3.2 Questions

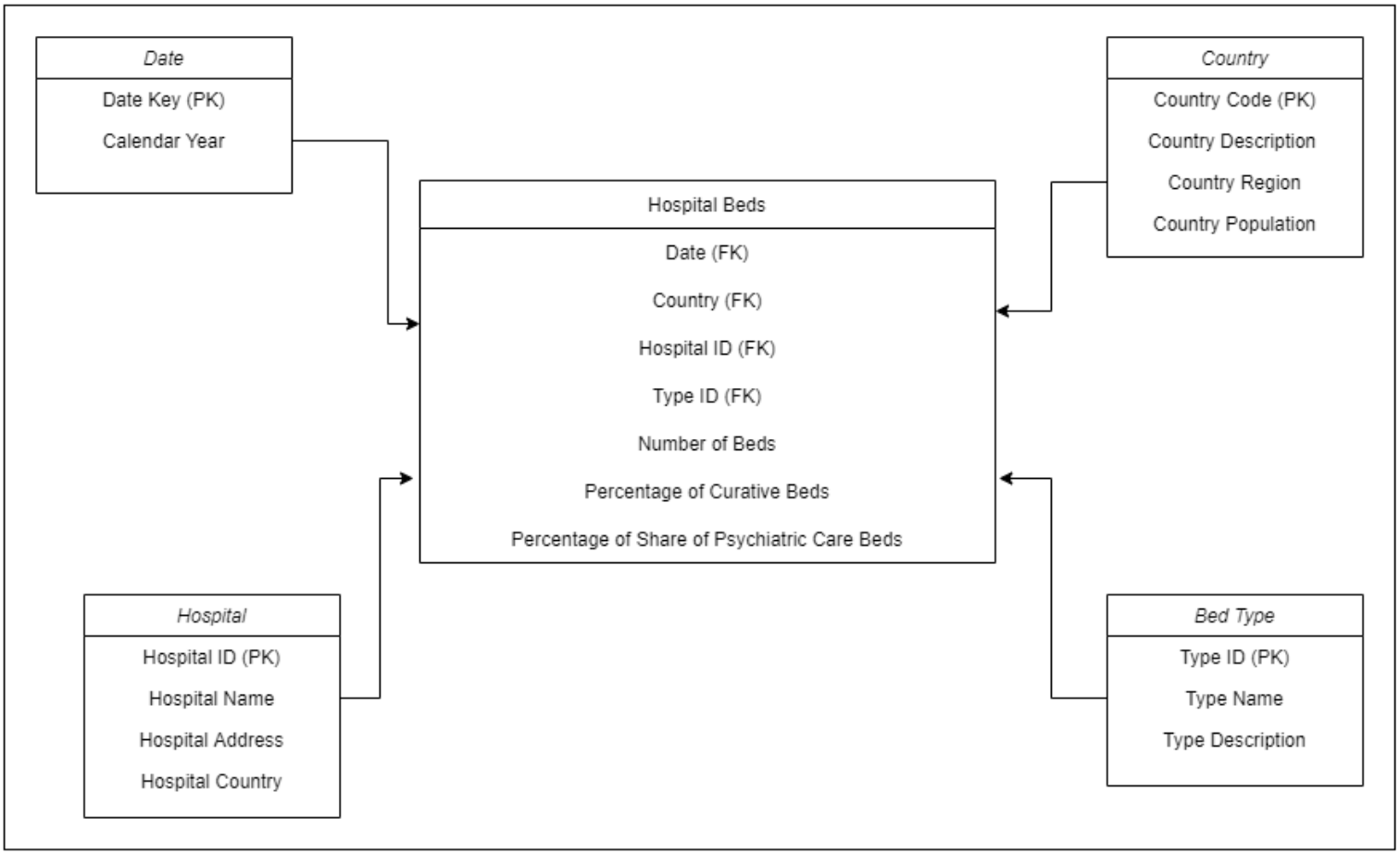
Q1: What countries have a low level of health?

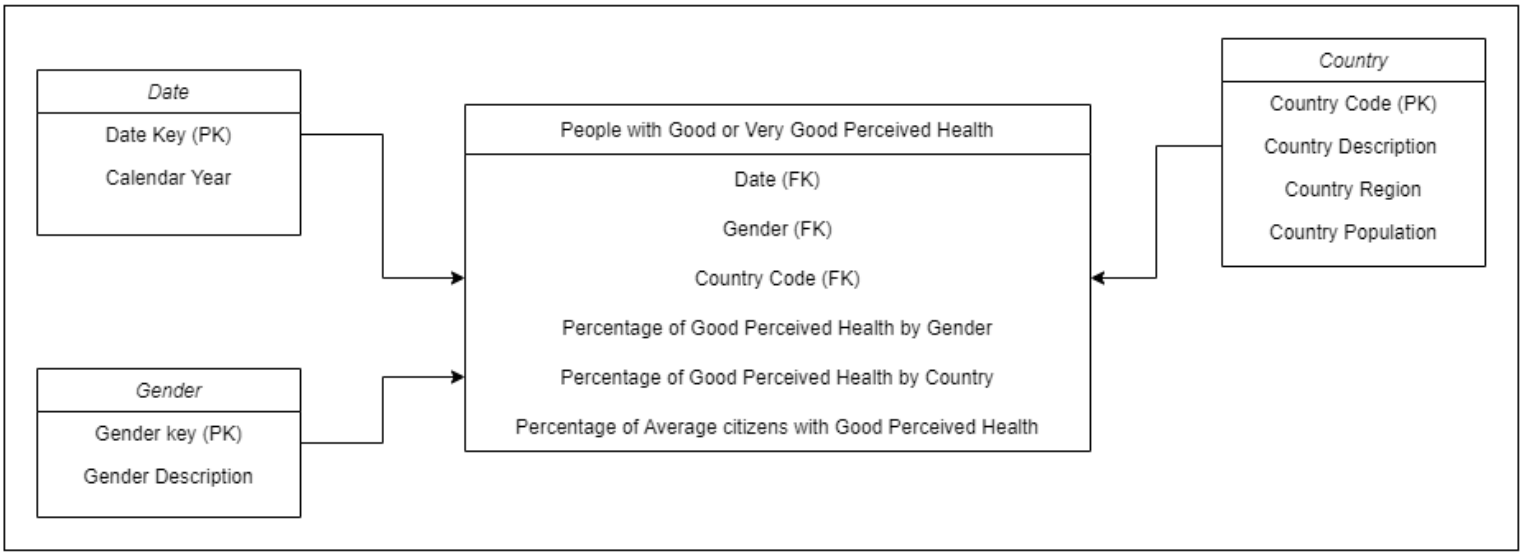
Q2: What countries are short of hospital beds (compared to the average)?

Q3: Which countries can afford our products?

3.3 Dimensional Models





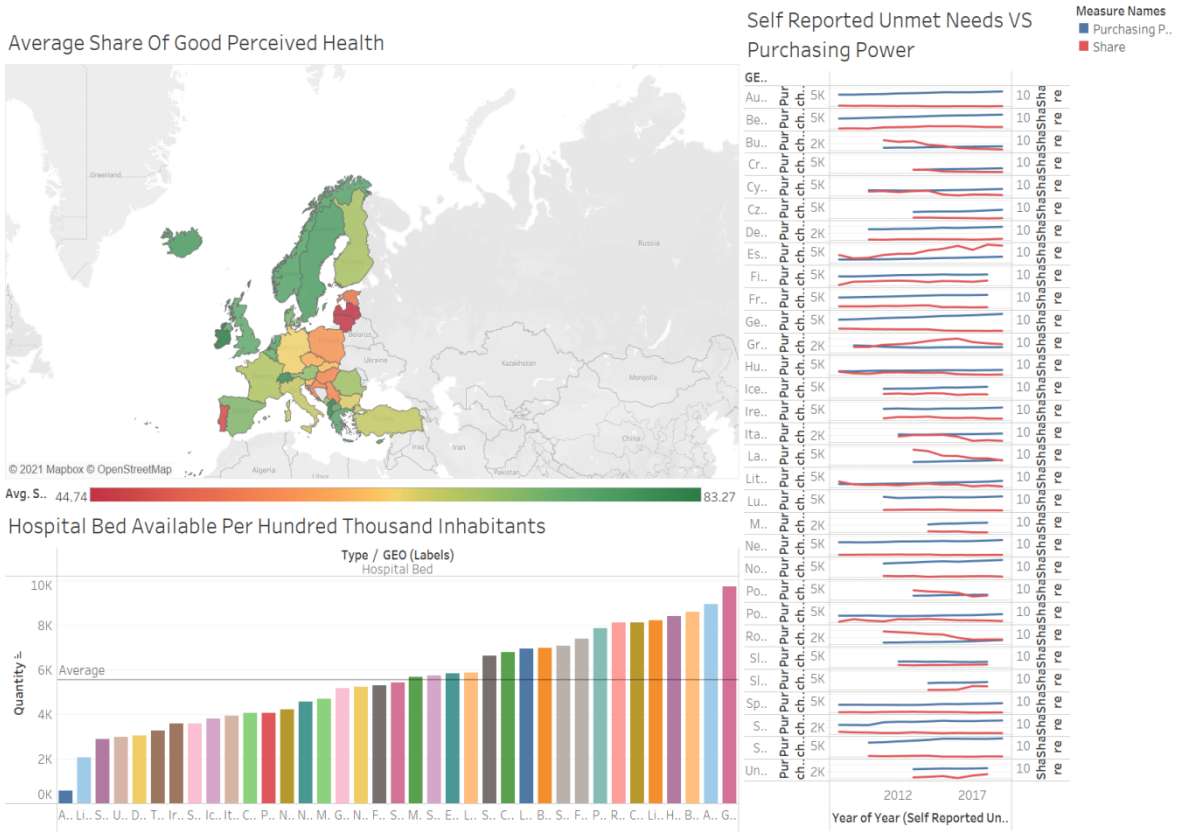


3.4 Tableau Dashboard

The dashboard depicts countries with a lower level of health by showing the average share of good perceived health. Melanie can then focus on the countries with high healthcare demands.

Afterwards, she can see the number of available hospital beds these countries have and how they compare to the average of all European countries. Melanie can then focus on those countries with a small number of available hospital beds.

In determining whether patients in these countries would be able to afford the company's products, she can concentrate on those with higher levels of purchasing power. Melanie can also generate a more holistic view by also looking at how people's unmet needs compare to their purchasing power (she can see whether there is an increasing or decreasing trend in terms of inhabitants' buying power and their demands).



(Screenshot of the Tableau Dashboard for Persona 2)

4.0 The development of our Business Intelligence (BI) solution

4.1 The structure

With the Sense-making Framework as the structure backbone, the way we went through the assignment can be divided into four phases, each with its own 4 stages, which are “Data”, “Insights”, “Actionable Intelligence”, and “Feedback”. Notably, following the “Feedback” stage is not the end of the process, rather, valuable input is carried onto the “Data” stage in the next phrase.

The first phase was conducted individually by each group member via reading through the assignment files and instructions and developing brainstorming ideas individually. These ideas were gathered and digested during the first meeting as feedback.

The second phase started during our first meeting. With input from the previous phase, we explored different ways of interpreting and extracting the provided data. We thus viewed more comprehensively the types of data and its usability; narrowed down on the scope of the data for the assignment; and came up with a rough solution direction. After some discussion, we went on to finish allocated parts, and this generated a new series of feedback.

In the third phase, adjustments to the assignment scope were made according to the suggestions generated from the previous phase. During the second meeting, we settled down on the scope of data for visualisation, outlined and brainstormed what to include in the next 3 tasks, and started individual work.

Lastly, in the meeting prior to submission, again, utilising feedback from the previous stage, we developed insights on how to improve the report. In this section, we focus on the stages in the second and third phases.

4.2 Data

Although the data required for this report is structured, much organisation is still required. We treated the 17 Eurostat tables as our data warehouse and firstly performed the ETL process (Hallikainen, 2021a, p. 22-23). Then, we cleansed and enhanced the extracted data into the form characterising the quality we needed (Hallikainen, 2021b, p. 7, 9, 14).

Some of the values were incomplete, which affected our choice of data scope. After forming an approximate direction, we began choosing the tables relevant to each persona, and extracted them onto an integrated excel sheet in a standardised and structured format. Then, the extracted and cleansed data was loaded onto Tableau for further insight generation.

When building the Tableau dashboards, we noticed some data still was lacking data quality dimensions and decided to further enhance data quality. For example, we were once unable to visualise the data more aesthetically pleasing using two interactive graphs. After double-checking the Tableau settings were not at fault, we turned to the input data. We traced down the root cause of the glitch, which resulted from some duplicated and wrongly entered values. Afterwards, we monitored the change in Tableau outcomes, which was proven successful. We observed that the accuracy, completeness and uniqueness of the visualised data were damaged, and this triggered decreases in its interpretability and integrity.

4.3 Insight

After extracting and cleansing the data, visualisations are created on Tableau, based on the suitability and ease of understanding for our personas to answer their questions and make decisions for the tasks. We strived to make our dashboards interactive with OLAP operation. For instance, we created a visualisation of hospital beds that enable users to drill down to different subcategories of beds such as curative beds and psychiatric care beds. The personas can also view data from different dimensions, such as people with good perceived health by gender or by year.

The dashboard is also a business performance management tool, assisting users in observing the trends and analysing the data. Dashboards, describing the status of key indicators of healthcare systems, enables the personas to understand the situation more efficiently and develop insights accordingly. Users can use the insights gained from past data to predict future trends. This allows Dr Petit and Melanie to make informed decisions of public health policies and company investment respectively. Our BI solution assists and expedites insights derivation from data sources and provides solid foundations for the next steps.

4.4 Actionable Intelligence

To successfully implement a BI solution, the specific decision environment in which the BI system is implemented must be clearly defined and understood (Foshay & Kuziemsky, 2014). Thus, personas were developed to provide insights to assist in the decision-making process of BI solution development. Healthcare organisations often aim to maximise the utilisation of resources effectively, therefore information is crucial in supporting evidence-based decisions and changing situations (Arefin, Hoque & Rasul, 2020). Hence, when developing the personas, different types of decision environments were considered. The two personas developed focused mainly on simple and complicated contexts. Meanwhile, both chaotic and complex decision environments were eliminated primarily due to the nature of the healthcare sector being heavily influenced by fact-based management.

The first persona, the health minister, was positioned in a simple context as he relies on repeating patterns to implement and execute health-related policies. The second persona was positioned in a complicated context since for the second persona's company to expand into a new market, expert diagnoses of the markets and multiple feasible strategies are needed.

The alignment of BI with business goals and strategies are crucial success factors. The personas were ultimately created to determine and understand the problems and opportunities this BI solution would potentially solve.

4.5 Feedback

A successful BI solution utilises data with rigorous quality, which generates valuable insights on which meaningful actions can be taken. Through actionable intelligence, feedback is generated, and this becomes an input for the next phase. From data interpretation, cleansing, and structuring, to discovering insights to act upon, and to performing the identified tasks each task is built on top of feedback gained previously. A greater competitive advantage can be attained with the help of BI capabilities (Hallikainen, 2021c). It should be noted that BI solutions have BI capabilities supported by BI tools, which are used by humans.

The report encompasses the three capabilities of information integration, insight creation, and presentation. Data from different repositories are linked for the different usages for each persona. This then further facilitated the developments of the visualisation aims and the subsequent interactive Tableau dashboard presentation.

5.0 Learning Reflection

5.1 Challenges

For this assignment, despite being formatted and organised, the data in the tables still have incomplete values. For high-quality insights, we first need to filter out any misleading values to ensure the value and quality of data.

Proper interpretation of data is also complicated. Initially, we have many different data from different aspects. To answer a practical question of a wide scope, we need to critically assess the relevance between certain data and the question and decide how to connect them. For example, since there are multiple measurements in terms of expenditure, we need to carefully select the most expressive measurement to ensure the quality of the answer.

After generating the insight and ideas, choosing the right visualisation can be hard. Among all the available choices, including bar charts, line charts or pie charts, we need to figure out the key indicator of our visualisation and determine whether the focus is the trends or the individual values. As a key part of presentation ability, this part could lead to either great or bad outcomes in terms of BI implementation.

In addition, finding the relationships among different aspects of data can be tricky. Some of the data given such as expenditure and perceived health may not seem to be related, but there might be some underlying connections that picture the overall health status of a country. To better utilise the data, time and effort are invested in analysing connections among different data and figuring out possible insights that may be generated based on their relationships.

5.2 Proposed Solutions

The solutions in mitigating challenges include data cleansing, visualisation difference analysis and proper tutorials of the analysis tools.

First, we excluded all missing values to increase the data quality. This is done by identifying those labelled with a negative value. We can thus more easily preclude the figures with no value and enhance the precision of the dashboard.

Next, we also differentiated all kinds of visualisations and selected the best choice for our purpose. For example, we emphasised the value in terms of expenditure and life expectancy while proportions may be more relevant towards bed availability. Therefore, a bar chart and a pie chart are used respectively to illustrate the individual focuses and to improve the usefulness of our dashboard.

Being relative beginners at using Tableau, we relied heavily on online tutorials for more in-depth details on data visualisation and formatting. For instance, issues on how to display data in a map chart and create interactivity for the dashboard.

(word count: 2454)

6.0 References

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