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Global Networks and Innovation: A1 Company Report

Samsung Electronics Co. Ltd. , Dataset: USPTO_2012_4

1 Introduction

The report includes analysis of Samsung Electronics Co. Ltd. And the given Dataset: USPTO_2012_4. The data set has been analysed to have an understanding of the company's internal and external relationships with subsidiaries, suppliers or any other sister concerns. How they operate, in what degree they are connected and their overall functionality will be illustrated through the data analysis. To do so, the coding language of Python has been used and a "Jupyter" notebook used to write the code and other necessary explanations. In the first part of the report, the company's overview is illustrated and Samsung Electronics Co. internationalisation strategy has been discussed. The middle part of the report illustrates data analysis to show data visualization for company networks

2 Company Overview

Samsung Electronics Co. Ltd is a South Korean firm that primarily manufactures and distributes electrical items across the globe (Reuters, 2022).The Company has four segments in their operation. These are; network systems, digital cameras, handheld phones (HHPs) and computers. Company's device solution work on semiconductor and display components of the device, within this department company also produces; thin film transistor-liquid crystal displays (TFT-LCDs), dynamic random access memories (DRAMs), flash memory, and Consumer Electronics (CE) and colour televisions (CTVs), monitors, printers, air conditioners, refrigerators, and washing machines (Samsung Electronics Co Ltd, 2022). Harman's automotive sector produces head units, infotainment systems, telematics, and speakers, among other products. The Company sells its goods both domestically and internationally.

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Figure1 = Image.open('figure 1.png')
```

[ ]:

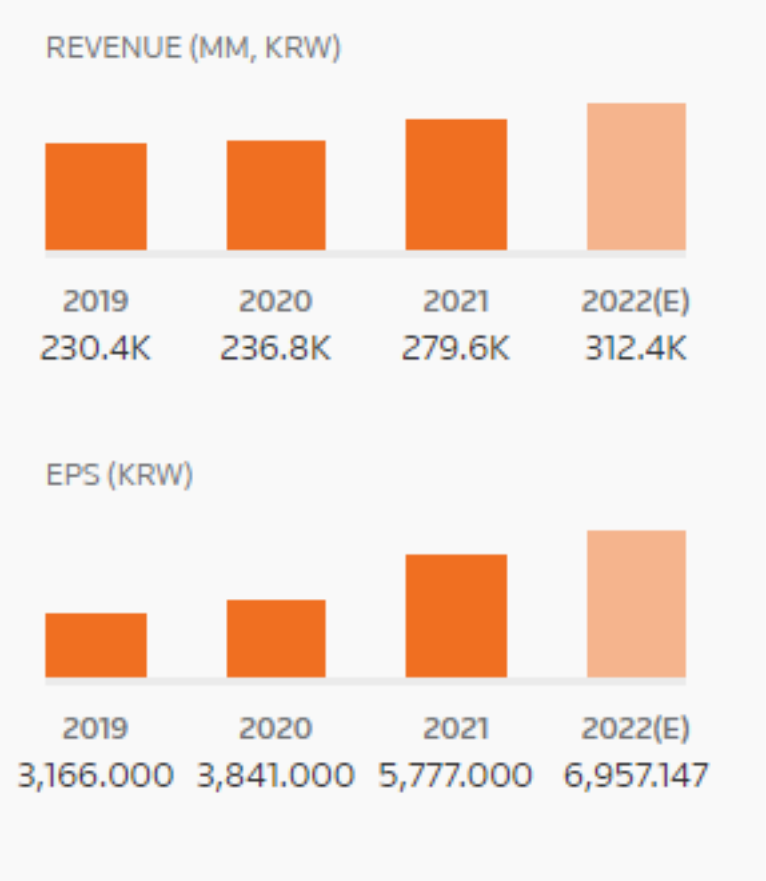


Figure 1: Key Stats of Samsung Electronics Co. Ltd in the year 2019 to 2022. Source: Reuters

However, in the given data, analysis shows Samsung Electronics Co. Ltd. in 2012 had a total patent count of 64500, total Turnover lay 1590113.0, total turnover 2370656.0, total asset 943428.0, Number of employees 301.

3 Internationalization Strategy of Samsung Electronics Co. Ltd.

3.1 Integrated Framework of Responsiveness

Samsung E. Co. Ltd., operates worldwide business through the trading name of Samsung. Company provides similar products to consumers across various locations globally. The key to its unique services depend on its enterprise international strategy of integrated approach of responsiveness (Boschma and Ter Wal, 2007; Capaldo, 2007). From this context, there are four basic principles to consider. (Hong, 2012; Jang et al., 2019)

[ ]:
```
Figure2 = Image.open('/content/drive/MyDrive/Colab Notebooks/assignment/final/
↪obaidur/figure 2.jpg')
```

[ ]:

Figure 2: Samsung's Integrated Framework of Responsiveness.

From these four strategies, however, only could apply to Samsung international strategy. In the first place the company has started with the "Global Strategy"- that has given economic efficiency to integrate a range of sectors like; cost minimisation, product standardisation, and quality control (Hong, 2012). From the analysis, it seems the company has the vision to become an International Corporation. To exemplify that, Samsung's "Galaxy" Model flagship series became readily available throughout the world, with similar features and consistent quality of the products. Using such a strategy, the company became one of the major smartphone manufacturers in the world. Firm has shared over 30% of the entire smartphone market (Samsung Electronics, 2022).

After a thorough analysis on the company's internationalisation strategy, it has emerged that the company also uses a "transnational" strategy- this strategy also derived from international strategy (Hong, 2012). This strategy mainly focuses on achieving economies of scale by adapting into the local market. It mainly focuses on operational advantages from the location as well as transformation of information flows and opportunities for development (Jang et al., 2019). Samsung adapted to this approach, it is because it is highly global at the same time it integrates to local needs- in which company operates. Especially adopting this strategy, companies achieve full economies of scale and match contextual opportunities. It is seen that Samsung's commercial activities are

aligned with the key components of this approach. Company has been trying to create production facilities in a new market, for example factories in South African Countries and Egypt back in 2016. However, one particular example signifies that the company has been trying to achieve economies of scale by adopting a transnational (internationalisation) strategy. In the same year in Nigeria Company has to withdraw their launch due to disparities in infrastructure and taxation. This proves that Samsung as a company aspires to achieve economies of scale through their transnational (internationalisation) strategy.

3.2 Strategic Partnership

Over the years, Samsung has been engaged in a number of other notable collaborations. Beginning of 2005, Apple Inc. formed a cooperation with Samsung for mobile phone parts and other portable goods. Especially, Apple required phone memory as the industry was in a state of influx. However, back in 2005 Samsung was the only company that could compete with Apple Inc. on price war. Company's technological achievements over the years placed them in command of about 50% of the "NAND flash memory production- this is a type of electronic non-volatile memory storage which can be used in phone to re-programmed and erased electronically. This gives the company a competitive advantage as they were able to get hold of such rare commodity (Park et al., 2011). While Apple Inc. benefited from this cooperation by having a reliable supply of technical components such as CPUs and memory for their devices, Samsung got valuable insight into the rapidly growing smartphone business. The cooperation reached its zenith when both businesses were working together on the development of the primary processor for Apple's top range devices- but that cooperative work did not stay for long. As the company gained rare insight from this collaboration- Samsung's emphasis on research and development and experience with Apple's production process persuaded the company's management that it should join the smartphone market. The"Omnia" was the first end product of the company's first smartphone venture, after that "Galaxy S" series of smartphones was introduced. Through the collaboration, Samsung has benefitted through research and development, became one of the fierce competitor of Apple Inc. This shows company's adventurous collaboration approach to expand its international business.

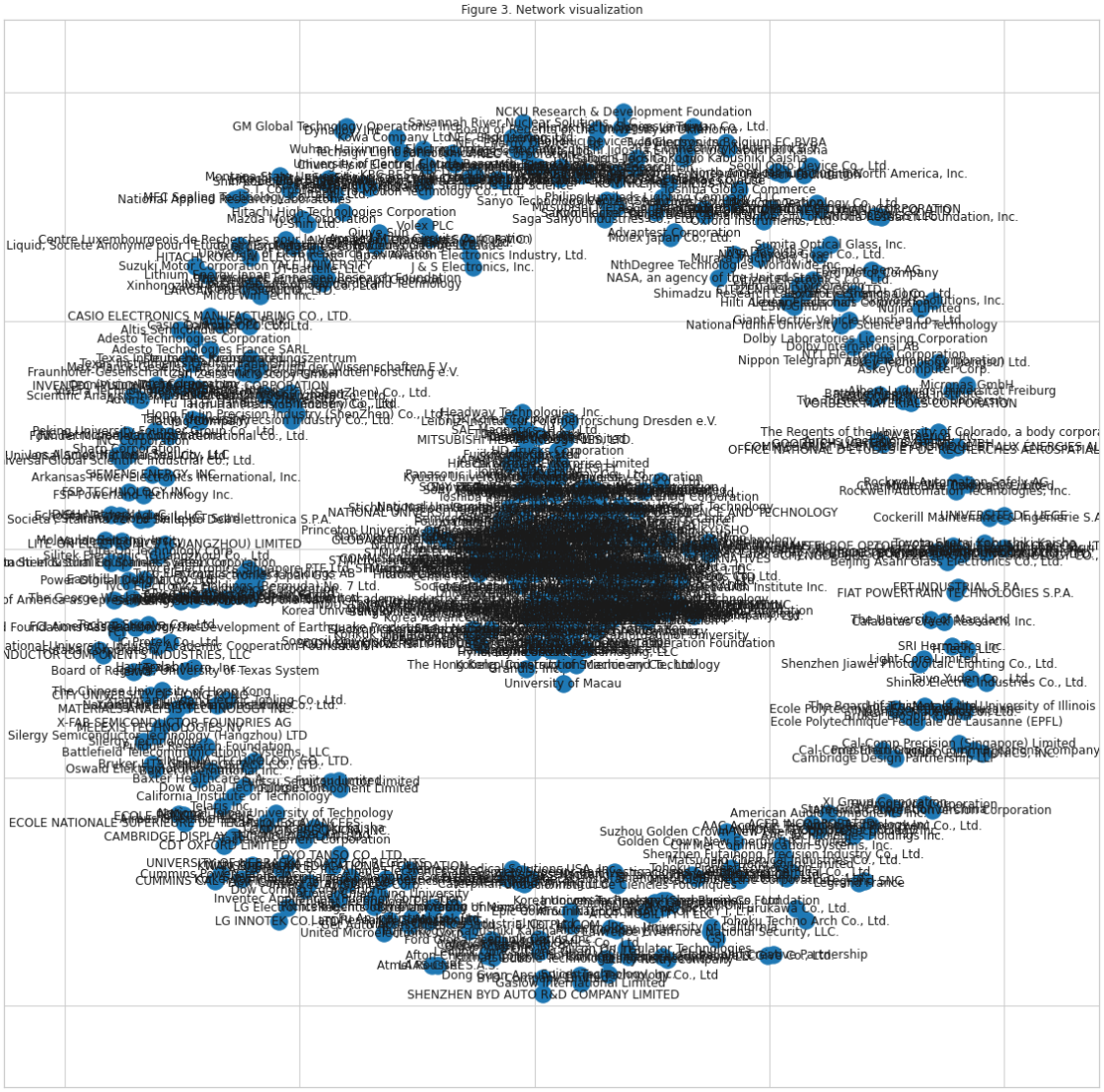
4 Data Visualizations and Network Analysis

Provided dataset edge list corresponds to: Number of nodes (companies): 638 and Number of edges (connections): 533.

From Figure 3, it shows the network is an industrial network- is a means of transferring information (Gilsing et al., 2008; Grus, 2015). Networks, on the other hand, differ depending on the amount of data being transported. Industrial networks are networks that deal with the flow of data on a big scale on a consistent basis.

[ ]:
```
plt.figure(figsize=(20,20))
nx.draw_networkx(graph_network)
plt.title('Figure 3. Network visualization')
```

Figure 3. Network visualization



From figure 4.0 we can see that the network has 2 communities(blue, red). The community detection was done using Girvan_newman algorithm. Under the Girvan-Newman algorithm, the communities in a graph are discovered by iteratively removing the edges of the graph, based on the edge betweenness and centrality value. The edge with the highest edge betweenness is removed first.Samsung Electronics Co. Ltd. have number of degree = 25 which means it has total of 25 unique direct connections with companies.

[ ]:
```
entities = networkx.algorithms.community.centrality.girvan_newman(G)

nodeEntities = []

for entity in next(entities):
  nodeEntities.append(list(entity))
```

```
maps= []

for company in graph_network:
  if company in nodeEntities[0]:
    maps.append('red')

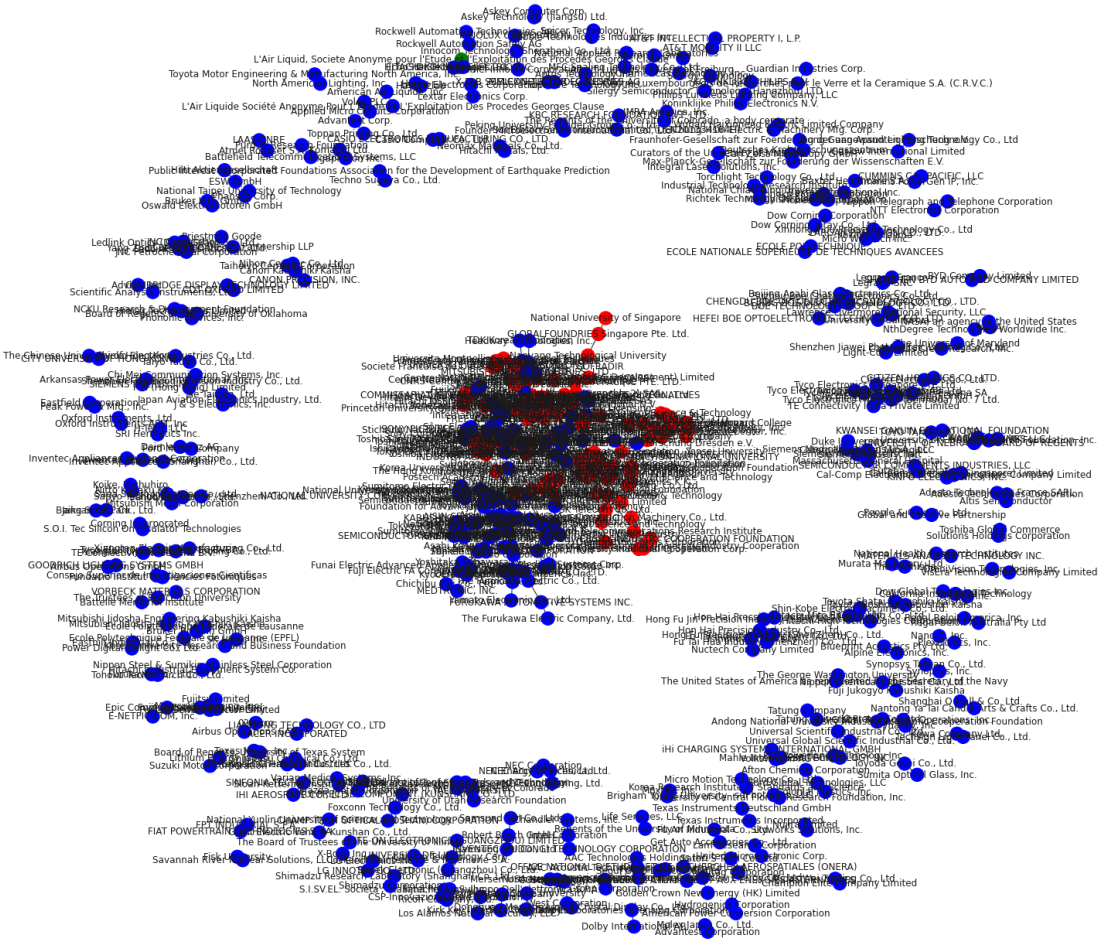
  else:
    maps.append('blue')

plt.figure(figsize=(20,20))

networkx.draw(graph_network, maps, with_labels=True)

plt.title('Figure 4. girvan_newman community detection')
```

Figure 4. girvan_newman community detection



5 Primary Data Interpretation

Degree Centrality Identification: it counts the total number of connections to identify node connectivity (Goncalves and Perra, 2015). For the dataset of edge list it can be seen that the top 3 best connected companies was: Samsung Electronics Co. Ltd. (0.03924646781789639), International Business Machines Corporation (0.03296703296703297), Toyota Jidosha Kabushiki Kaisha (0.02197802197802198). Meanwhile, Hitachi Displays, Ltd. (0.0015698587127158557), JAPAN DISPLAY INC. (0.0015698587127158557), Henkel Corporation (0.0015698587127158557) has a relatively lower degree centrality which means it has the lowest connections among other companies of the dataset.

Eigenvector Centrality Measures: Eigenvector centrality measures a node's effect on a network (Goncalves and Perra, 2015). A node's eigenvector centrality increases if numerous other nodes point to it. International Business Machines Corporation (0.45813003028955307), Samsung Electronics Co. Ltd. (0.4316882680143975), STMICROELECTRONICS S.R.L. (0.33897072011146945) had the eigenvector centrality which indicates that they are the most important companies in the network. It can be seen that the ranking of companies based on Degree of centrality and eigenvector centrality is quite similar. It's because the most connected companies are the ones who are more important in the network.

Betweenness Centrality Identification: In the network Samsung Electronics Co. Ltd. (0.09045562104861295), IMEC (0.05288860585356546), International Business Machines Corporation (0.04846897636655047) had the highest betweenness score and they are the ones who influence the flow of information around the network. They are the ones whose removal from the network will most disrupt communications between other companies because they are the top connected companies.

Closeness Centrality Identification: Top 4 closely centred Companies were : Samsung Electronics Co. Ltd. (0.11556670253543498), IMEC (0.10819312151476919),International Business Machines Corporation (0.10100503325834695). So, these companies with high closeness centrality is literally close to other companies. Companies with high closeness have, on average, short paths to many other companies, which can be helpful for disseminating resources quickly (Gilsing et al., 2008; Grus, 2015).

Distance (Shortest Path) Identification: Figure 5 below, shows the shortest path from Samsung Electronics Co. Ltd. to their connections. Attribute dataset had a total 215 companies with 11 features initially. Among them there was an unnecessary feature named Unnamed: 10. So we need to drop the column. Finally the total shape of attributes (215, 10)

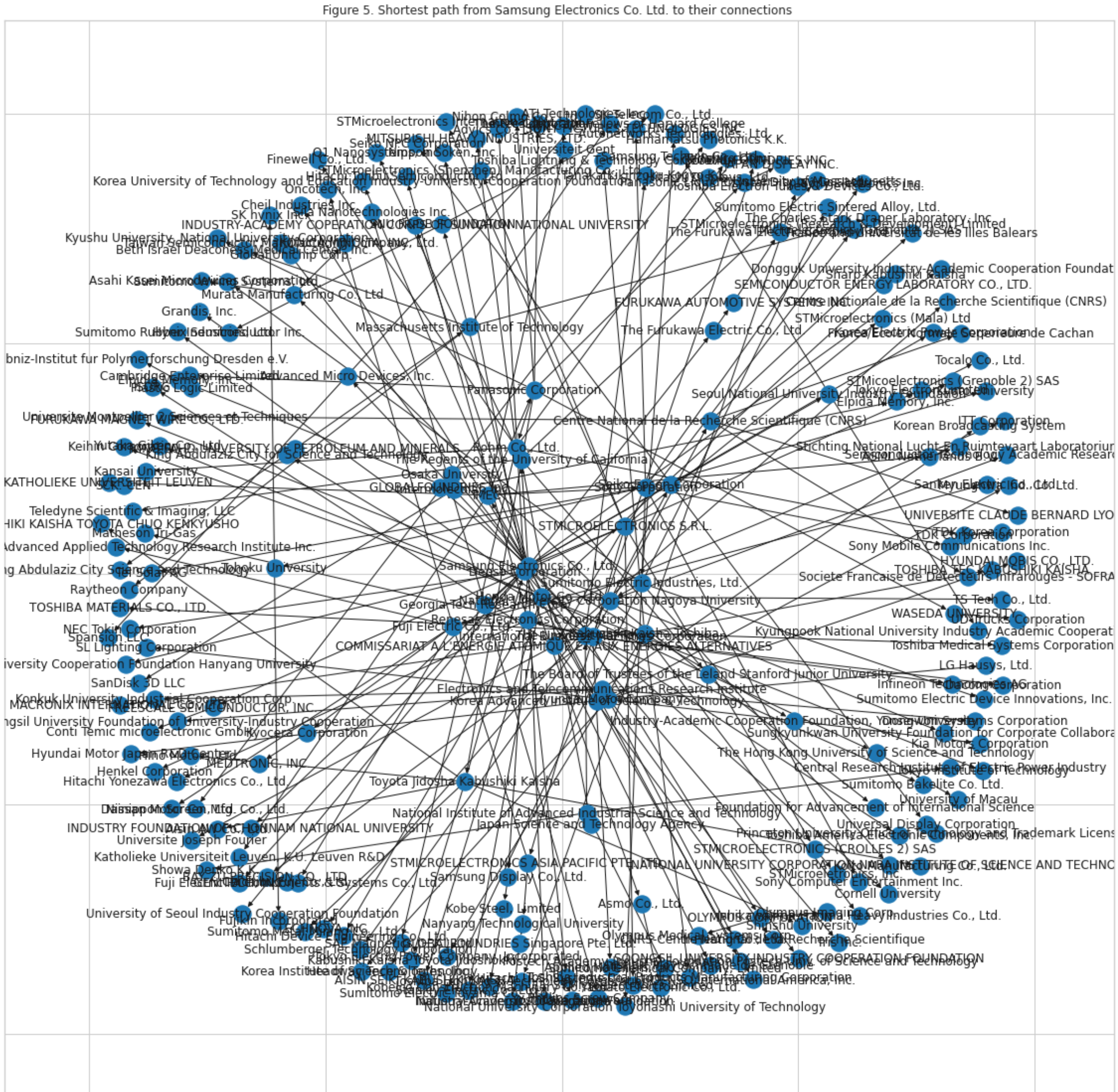
[ ]:
```
Samsung_shortest_path = networkx.bfs_tree(graph_network,"Samsung Electronics Co.
↪, Ltd.")

networkx.draw_networkx(Samsung_shortest_path)

plt.title('Figure 5. Shortest path from Samsung Electronics Co. Ltd. to their␣
↪connections ')
```

```
plt.show()
```

Figure 5. Shortest path from Samsung Electronics Co. Ltd. to their connections



Identification of Other Attributes: Figure 6 below indicates that the attribute dataset had missing values in R&D_2012, Employees_2012, Turnover_2012, Total_assets_2012, Turnover lay and Country code. Among them R&D_2012 had the highest missing values with 58% and country code had the least with 12%

```
[ ]: total = df.isnull().sum().sort_values(ascending=False)

percent = ((df.isnull().sum()/df.isnull().count())*100).
 ↪sort_values(ascending=False)
```

```
missing_data = pd.concat([total, percent], axis=1, keys=['Total', 'Percent'])

axes = missing_data.plot.bar(subplots=True)

plt.title('Figure 6. Total and percentage of missing values for each column')

axes[1].legend(loc=1)

plt.show()
```

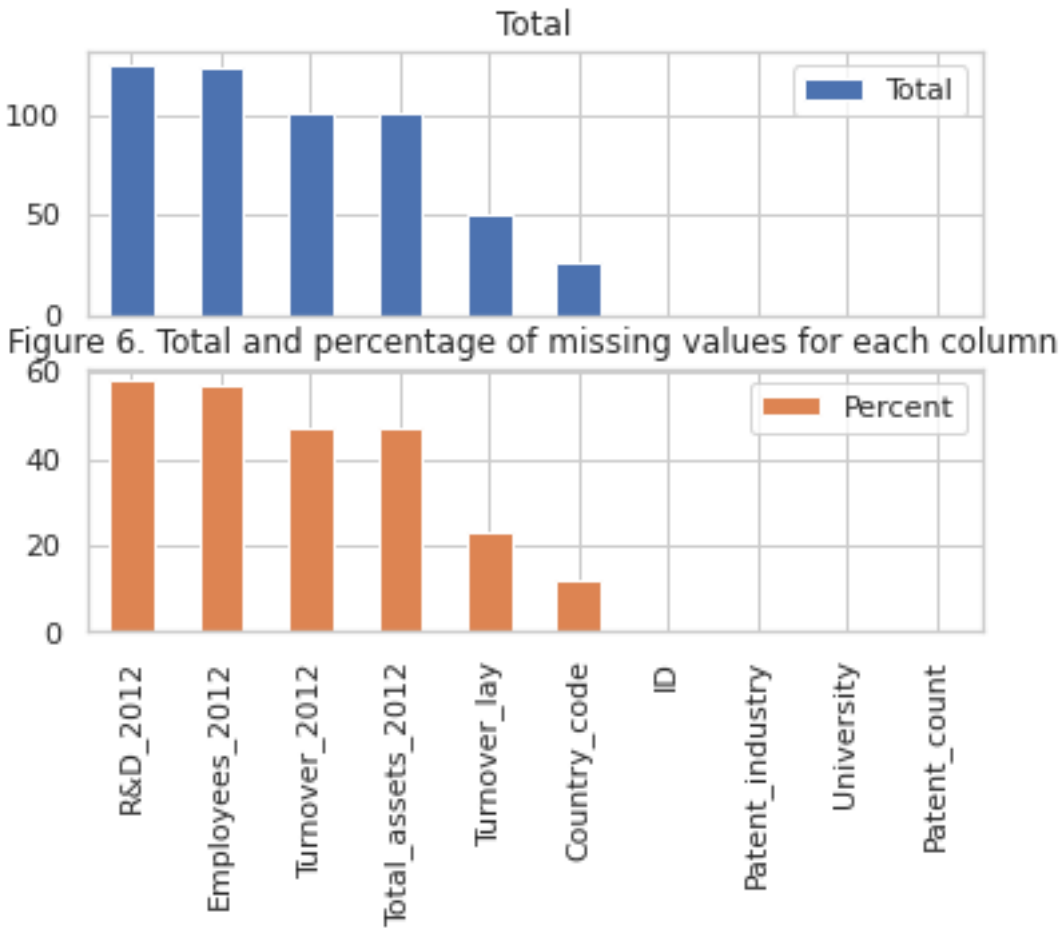


Figure 6. Total and percentage of missing values for each column

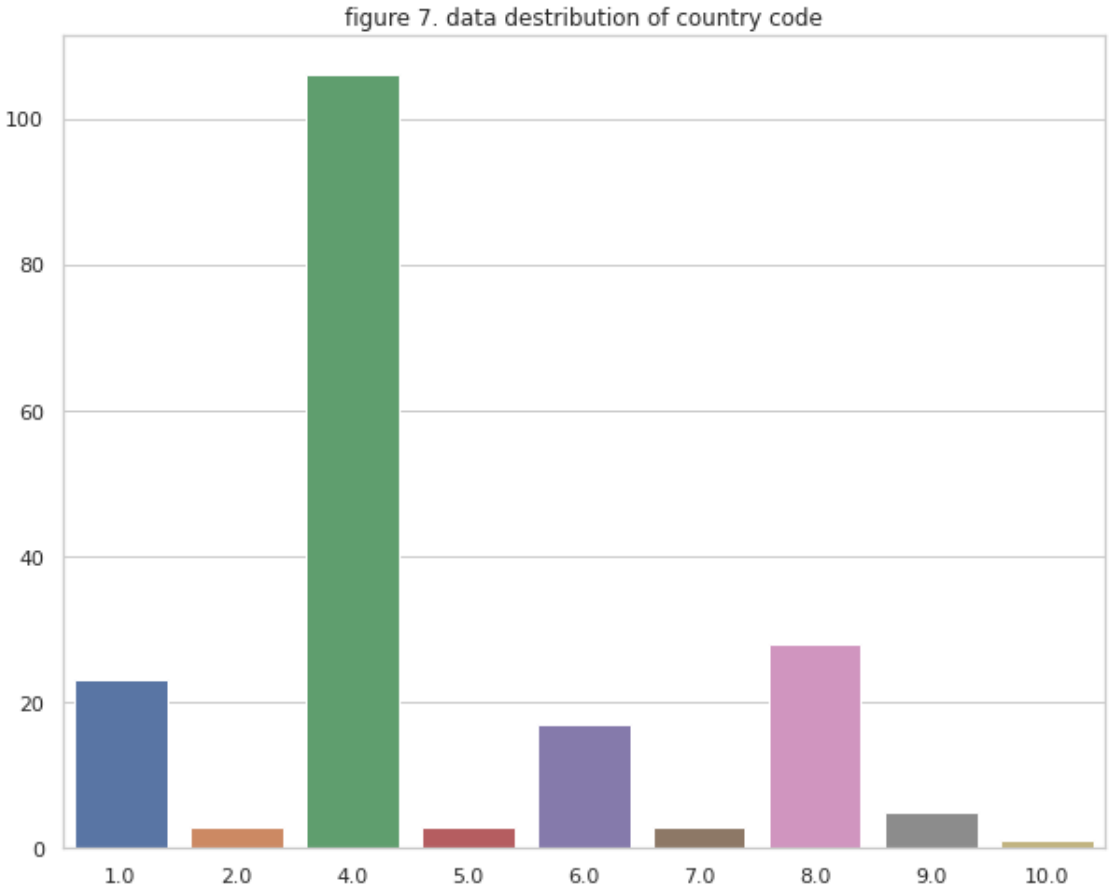
While Figure 7, below indicates that the dataset had the highest number of companies situated by Country code 4 and the lowest at Country code 10.

[ ]:
```
plt.figure(figsize=(10,8))

plt.title('figure 7. data destribution of country code')
```

```
sns.barplot(x=df.Country_code.value_counts().index, y=df.Country_code.
↪value_counts().values)

plt.show()
```



6 Samsung Electronics Co. Ltd. innovation strategies and their Implication

6.1 Harvesting Innovation

Samsung Electronics has put innovation in the heart of their strategy, to acquire a worldwide competitive edge. This has allowed the organisation to develop value and profit from developing markets with predictable cash flows (Rosenbusch et al., 2011). Instead of growing semiconductor production, the company has created innovative products including flash memory, DRAM etc. Because these new products meet consumers' demands across various location in their operation. While companies in the PC and smartphone sector are also making significant benefits out of the innovation project. These remarkable outcomes of harvesting innovative culture in the firm have drew significant attention to its innovation harvesting technique across the sector. Company has taken an initiative called Value Innovation Program (VIP), which was established in 1998. It has

helped companies to create new products. Staff in the research and development (R&D) sector benefited from these innovative ideas. Such ingenuity to develop and harvest innovative organisational culture amplified the company's consistent product development. According to various researchers, value innovation strategies have helped generate numerous innovative concepts. This approach was designed to help people transcend the previous success syndrome and see what is achievable and push the boundary to the limit.

6.2 Blue Ocean Strategy for Innovation

Samsung Electronics' another strategy that helped the company to shape its innovation, hence, to achieve the competitive advantage, the ultimate goal is to create a completely new market by creating a demand. This strategy referred to a new product or market where less or no competition exists (Carton, 2017). This only is possible through the research and development for new kinds of products. Company's senior leadership has pushed this through to adopt this approach for value creation. As a result, the company successfully created new products that surprises and delight its consumers. The recent example of this Galaxy Folding Series, it is futuristic, consumers only were able to imagine it. But the company's innovative technology has created an entire new market of folding screen series of phones. .

7 Conclusion

This report illustrated Samsung Electronics' Internationalization strategy as a unique of its kind. The company has collaborated to supply components of handheld phone materials with other companies like Apple Inc. back in the 90s. From that collaborative approach, Samsung became a fireless competitor in the market. They have created a whole new demand and class of new consumers. This, only possible not only for their innovative approach but their regional leadership in management and manufacturing. Company's vast network has helped to make this even easier for them. From the given data it is imperative to mention that the company has close approximations with their suppliers and subsidiaries. The author believes their innovative and strong R&D expenditure has such strategies implementable. In the future, companies should focus on AI and Algorithm technology to create innovative products for physically challenged communities and tackle unsustainable practices within the industry.

8 References

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