DIRECTORS AND ABOVE ANALYSIS

In [1]:
```
# List files in the input directory
import os;
os.listdir ('/kaggle/input/')
```

Out[1]:
```
['directors']
```

In [2]:
```
# Read the Excel file into a DataFrame

import pandas as pd

df = pd.read_excel('/kaggle/input/directors/Directors .xlsx')
```

In [3]:
```
# Display the first few rows of the DataFrame
df.head()
```

Out[3]:

	Employee ID	Employee Status Number	Employee Status	Employee Group	Position Title	Grade	Hire Date	Tenure Years	Age	Supervisor Employee Number
0	2001469	1	Active	1	EVP & Chief Operations Officer	13	2001-01-30	23	59	60000419
1	2004559	1	Active	1	EVP & Chief Information Officer	13	2016-03-21	8	51	60000419
2	60001995	1	Active	1	Regional Vice President IGWM Sales	11	1995-08-31	28	51	60001977
3	2004242	1	Active	1	Regional Vice President IGWM Sales	11	1992-06-22	31	59	60001977
4	60001970	1	Active	1	Regional Vice President IGWM Sales	11	1990-07-16	33	59	60001977

5 rows × 41 columns

In [4]:
```
df.tail()
```

Out[4]:

	Employee ID	Employee Status Number	Employee Status	Employee Group	Position Title	Grade	Hire Date	Tenure Years	Age	Superv Emplo Num
606	12150	1	Active	1	AVP Data Architecture & Analysis	10	2001-09-04	22	60	10
607	2006668	1	Active	1	SVP Architecture, Core Technology & IS	12	2017-08-30	6	52	2004
608	60000231	1	Active	1	VP EPMO & Quality Mgmt	11	2020-04-06	4	50	2004
609	2007886	1	Active	1	VP Digital Technology	11	2018-06-04	5	51	2004
610	10017	1	Active	1	VP Data Office	11	2003-02-07	21	47	2004

5 rows × 41 columns

In [5]:
```
# Rename columns 'Leader Same City2' to 'Leader Same City' and '09 Builds and appli
df = df.rename(columns={
    'Leader Same City2': 'Leader Same City',
    '09 Builds and applies selfUnratedinsight': '09 Builds and applies self insight
})

# Display the column names of the DataFrame
df.columns
```

Out[5]:
```
Index(['Employee ID', 'Employee Status Number', 'Employee Status',
       'Employee Group', 'Position Title', 'Grade', 'Hire Date',
       'Tenure Years', 'Age', 'Supervisor Employee Number', 'Division Name',
       'Company Name', 'Location Group', 'Is a People Leader Number',
       'Ia a People Leader', 'People Leader's Location', 'Flight Risk',
       'Loss Impact', 'Talent Assessment', '2023 Performance Rating',
       '01 Explores Broadly and Innovates',
       '02 Thinks Critically and Shares Ideas', '03 Understands our Business',
       '04 Manages Complexity', '05 Engages and Influences Others',
       '06 Attracts, Develops and Retains Talent', '07 Drive for Results',
       '08 Optimizes Work Processes', '09 Builds and applies self insight',
       '10 Demonstrates resilience and adaptability', 'Leader Same City',
       'Comparatio', 'Gender', 'Career Stream', 'Direct Reports',
       'Vacation Annual Entitlement', 'Wellness Used', 'Wellness Accrued',
       'Vacation  Used', 'Vacation - Accrued', 'Leader User Sys ID'],
      dtype='object')
```

In [6]:
```
# Display information about the DataFrame
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 611 entries, 0 to 610
Data columns (total 41 columns):
 #   Column                                      Non-Null Count  Dtype
---  ------                                      --------------  -----
 0   Employee ID                                 611 non-null    int64
 1   Employee Status Number                      611 non-null    int64
 2   Employee Status                             611 non-null    object
 3   Employee Group                              611 non-null    int64
 4   Position Title                              611 non-null    object
 5   Grade                                       611 non-null    int64
 6   Hire Date                                   611 non-null    datetime64[ns]
 7   Tenure Years                                611 non-null    int64
 8   Age                                         611 non-null    int64
 9   Supervisor Employee Number                  611 non-null    int64
 10  Division Name                               611 non-null    object
 11  Company Name                                611 non-null    object
 12  Location Group                              611 non-null    object
 13  Is a People Leader Number                   611 non-null    int64
 14  Ia a People Leader                          611 non-null    object
 15  People Leader's Location                    611 non-null    object
 16  Flight Risk                                 611 non-null    int64
 17  Loss Impact                                 611 non-null    int64
 18  Talent Assessment                           611 non-null    int64
 19  2023 Performance Rating                     611 non-null    int64
 20  01 Explores Broadly and Innovates           611 non-null    int64
 21  02 Thinks Critically and Shares Ideas       611 non-null    int64
 22  03 Understands our Business                 611 non-null    int64
 23  04 Manages Complexity                       611 non-null    int64
 24  05 Engages and Influences Others            611 non-null    int64
 25  06 Attracts, Develops and Retains Talent    611 non-null    int64
 26  07 Drive for Results                        611 non-null    int64
 27  08 Optimizes Work Processes                 611 non-null    int64
 28  09 Builds and applies self insight          611 non-null    int64
 29  10 Demonstrates resilience and adaptability 611 non-null    int64
 30  Leader Same City                            611 non-null    object
 31  Comparatio                                  611 non-null    float64
 32  Gender                                      611 non-null    object
 33  Career Stream                               611 non-null    object
 34  Direct Reports                              611 non-null    int64
 35  Vacation Annual Entitlement                 611 non-null    int64
 36  Wellness Used                               611 non-null    float64
 37  Wellness Accrued                            611 non-null    int64
 38  Vacation  Used                              611 non-null    float64
 39  Vacation - Accrued                          611 non-null    float64
 40  Leader User Sys ID                          611 non-null    int64
dtypes: datetime64[ns](1), float64(4), int64(26), object(10)
memory usage: 195.8+ KB
```

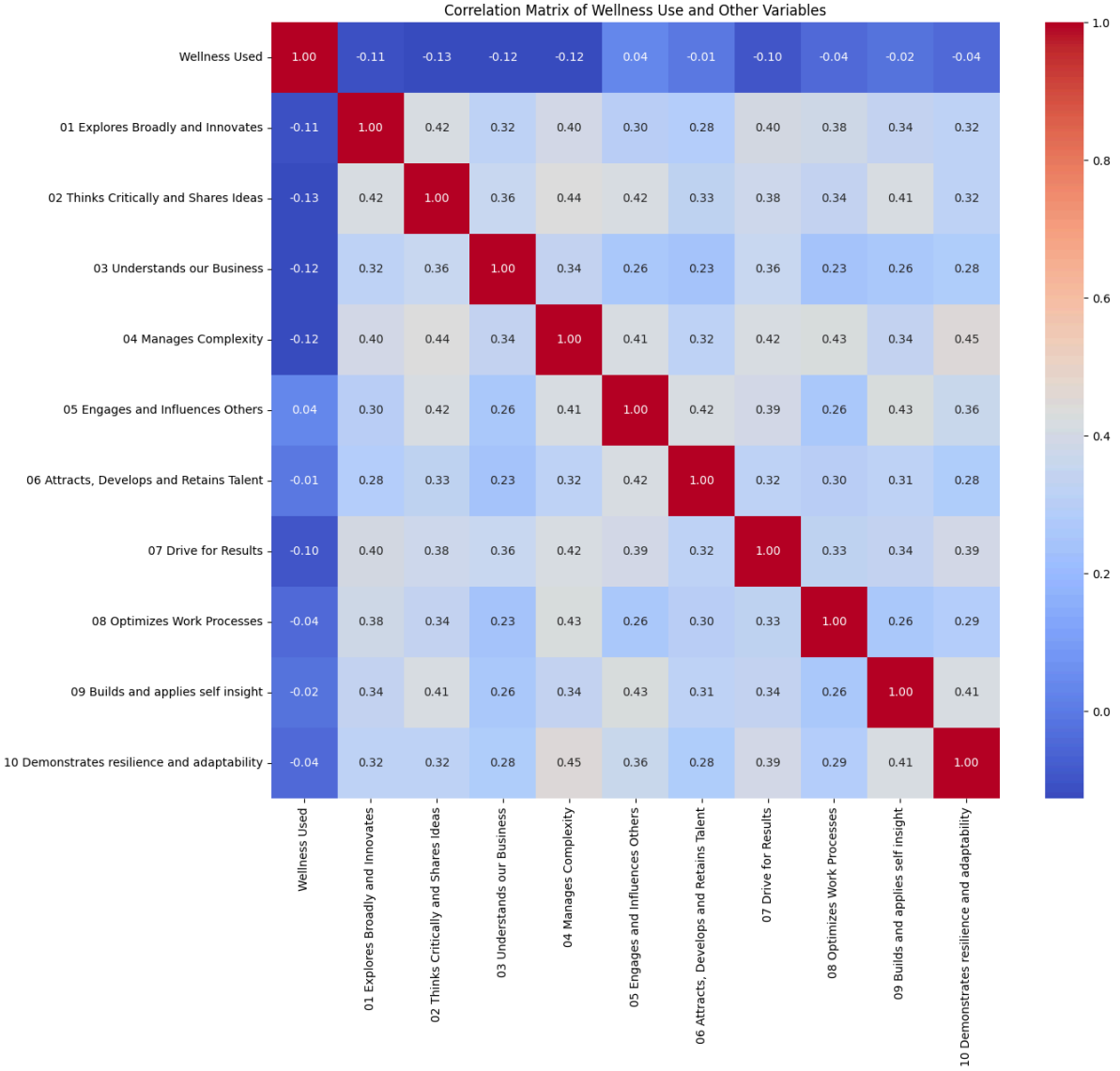
In [7]:
```
# Check for missing values
print(df.isnull().sum())
```

```
Employee ID                                    0
Employee Status Number                         0
Employee Status                                0
Employee Group                                 0
Position Title                                 0
Grade                                          0
Hire Date                                      0
Tenure Years                                   0
Age                                            0
Supervisor Employee Number                     0
Division Name                                  0
Company Name                                   0
Location Group                                 0
Is a People Leader Number                      0
Ia a People Leader                             0
People Leader's Location                       0
Flight Risk                                    0
Loss Impact                                    0
Talent Assessment                              0
2023 Performance Rating                        0
01 Explores Broadly and Innovates              0
02 Thinks Critically and Shares Ideas          0
03 Understands our Business                    0
04 Manages Complexity                          0
05 Engages and Influences Others               0
06 Attracts, Develops and Retains Talent       0
07 Drive for Results                           0
08 Optimizes Work Processes                    0
09 Builds and applies self insight             0
10 Demonstrates resilience and adaptability    0
Leader Same City                               0
Comparatio                                     0
Gender                                         0
Career Stream                                  0
Direct Reports                                 0
Vacation Annual Entitlement                    0
Wellness Used                                  0
Wellness Accrued                               0
Vacation  Used                                 0
Vacation - Accrued                             0
Leader User Sys ID                             0
dtype: int64
```

In [8]:

```python
import matplotlib.pyplot as plt
import seaborn as sns

# Define the columns for correlation analysis
cols_for_corr = df.columns[df.columns.get_loc('01 Explores Broadly and Innovates')
                           df.columns.get_loc('10 Demonstrates resilience and adapt


# Calculate the correlation matrix
corr_matrix = df[cols_for_corr].corr()

# Include 'Wellness Used' column in the correlation analysis
cols_for_corr = ['Wellness Used'] + list(cols_for_corr)

# Calculate the correlation matrix
corr_matrix = df[cols_for_corr].corr()

# Plot the correlation matrix using a heatmap
plt.figure(figsize=(14, 12))
sns.heatmap(corr_matrix, annot=True, cmap='coolwarm', fmt=".2f")
plt.title('Correlation Matrix of Wellness Use and Other Variables')
```

```
plt.show()

print("Correlation Matrix:")
print(corr_matrix)
```



Correlation Matrix:

	Wellness Used
Wellness Used	1.000000
01 Explores Broadly and Innovates	-0.111563
02 Thinks Critically and Shares Ideas	-0.127164
03 Understands our Business	-0.124670
04 Manages Complexity	-0.123665
05 Engages and Influences Others	0.036500
06 Attracts, Develops and Retains Talent	-0.008688
07 Drive for Results	-0.096314
08 Optimizes Work Processes	-0.039629
09 Builds and applies self insight	-0.024032
10 Demonstrates resilience and adaptability	-0.043119

	01 Explores Broadly and Innovates
Wellness Used	-0.111563
01 Explores Broadly and Innovates	1.000000
02 Thinks Critically and Shares Ideas	0.416648
03 Understands our Business	0.320000
04 Manages Complexity	0.397515
05 Engages and Influences Others	0.298526
06 Attracts, Develops and Retains Talent	0.283482
07 Drive for Results	0.403955
08 Optimizes Work Processes	0.381160
09 Builds and applies self insight	0.337637
10 Demonstrates resilience and adaptability	0.318847

	02 Thinks Critically and Shares Ideas
Wellness Used	-0.127164
01 Explores Broadly and Innovates	0.416648
02 Thinks Critically and Shares Ideas	1.000000
03 Understands our Business	0.356761
04 Manages Complexity	0.436008
05 Engages and Influences Others	0.421985
06 Attracts, Develops and Retains Talent	0.329387
07 Drive for Results	0.377441
08 Optimizes Work Processes	0.336220
09 Builds and applies self insight	0.412855
10 Demonstrates resilience and adaptability	0.315282

	03 Understands our Business
Wellness Used	-0.124670
01 Explores Broadly and Innovates	0.320000
02 Thinks Critically and Shares Ideas	0.356761
03 Understands our Business	1.000000
04 Manages Complexity	0.340193
05 Engages and Influences Others	0.262658
06 Attracts, Develops and Retains Talent	0.233836
07 Drive for Results	0.356624
08 Optimizes Work Processes	0.233258
09 Builds and applies self insight	0.261255
10 Demonstrates resilience and adaptability	0.280655

	04 Manages Complexity
Wellness Used	-0.123665
01 Explores Broadly and Innovates	0.397515
02 Thinks Critically and Shares Ideas	0.436008
03 Understands our Business	0.340193
04 Manages Complexity	1.000000
05 Engages and Influences Others	0.411447
06 Attracts, Develops and Retains Talent	0.322326
07 Drive for Results	0.422564
08 Optimizes Work Processes	0.429975

09 Builds and applies self insight	0.338649
10 Demonstrates resilience and adaptability	0.450461

	05 Engages and Influences Others
Wellness Used	0.036500
01 Explores Broadly and Innovates	0.298526
02 Thinks Critically and Shares Ideas	0.421985
03 Understands our Business	0.262658
04 Manages Complexity	0.411447
05 Engages and Influences Others	1.000000
06 Attracts, Develops and Retains Talent	0.415093
07 Drive for Results	0.389722
08 Optimizes Work Processes	0.256781
09 Builds and applies self insight	0.429645
10 Demonstrates resilience and adaptability	0.359930

	06 Attracts, Develops and Retains Talent
Wellness Used	-0.008688
01 Explores Broadly and Innovates	0.283482
02 Thinks Critically and Shares Ideas	0.329387
03 Understands our Business	0.233836
04 Manages Complexity	0.322326
05 Engages and Influences Others	0.415093
06 Attracts, Develops and Retains Talent	1.000000
07 Drive for Results	0.323227
08 Optimizes Work Processes	0.301600
09 Builds and applies self insight	0.314089
10 Demonstrates resilience and adaptability	0.279686

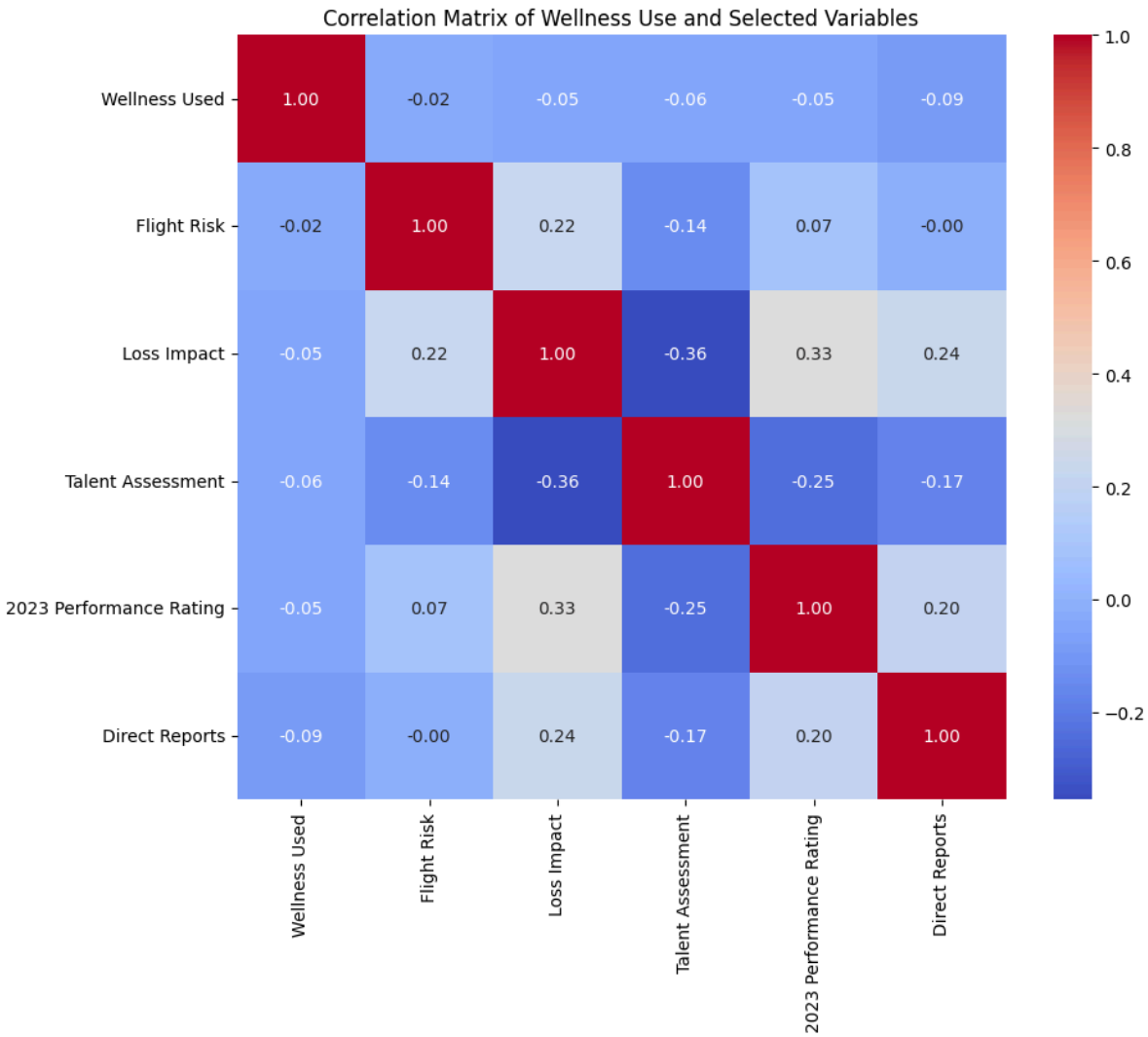
	07 Drive for Results
Wellness Used	-0.096314
01 Explores Broadly and Innovates	0.403955
02 Thinks Critically and Shares Ideas	0.377441
03 Understands our Business	0.356624
04 Manages Complexity	0.422564
05 Engages and Influences Others	0.389722
06 Attracts, Develops and Retains Talent	0.323227
07 Drive for Results	1.000000
08 Optimizes Work Processes	0.329164
09 Builds and applies self insight	0.337529
10 Demonstrates resilience and adaptability	0.393165

	08 Optimizes Work Processes
Wellness Used	-0.039629
01 Explores Broadly and Innovates	0.381160
02 Thinks Critically and Shares Ideas	0.336220
03 Understands our Business	0.233258
04 Manages Complexity	0.429975
05 Engages and Influences Others	0.256781
06 Attracts, Develops and Retains Talent	0.301600
07 Drive for Results	0.329164
08 Optimizes Work Processes	1.000000

```
09 Builds and applies self insight                              0.255494
10 Demonstrates resilience and adaptability                     0.290439

                                                09 Builds and applies self insight  \
Wellness Used                                                          -0.024032
01 Explores Broadly and Innovates                                       0.337637
02 Thinks Critically and Shares Ideas                                   0.412855
03 Understands our Business                                             0.261255
04 Manages Complexity                                                   0.338649
05 Engages and Influences Others                                        0.429645
06 Attracts, Develops and Retains Talent                                0.314089
07 Drive for Results                                                    0.337529
08 Optimizes Work Processes                                             0.255494
09 Builds and applies self insight                                      1.000000
10 Demonstrates resilience and adaptability                             0.414590

                                                10 Demonstrates resilience and adapta
bility
Wellness Used                                                                    -0.
043119
01 Explores Broadly and Innovates                                                 0.
318847
02 Thinks Critically and Shares Ideas                                             0.
315282
03 Understands our Business                                                       0.
280655
04 Manages Complexity                                                             0.
450461
05 Engages and Influences Others                                                  0.
359930
06 Attracts, Develops and Retains Talent                                          0.
279686
07 Drive for Results                                                              0.
393165
08 Optimizes Work Processes                                                       0.
290439
09 Builds and applies self insight                                                0.
414590
10 Demonstrates resilience and adaptability                                       1.
000000
```

In [9]:

```python
# Define the columns for correlation analysis
cols_for_corr = ['Wellness Used', 'Flight Risk', 'Loss Impact', 'Talent Assessment'
                 '2023 Performance Rating', 'Direct Reports']

# Calculate the correlation matrix
corr_matrix = df[cols_for_corr].corr()

# Plot the correlation matrix using a heatmap
plt.figure(figsize=(10, 8))
sns.heatmap(corr_matrix, annot=True, cmap='coolwarm', fmt=".2f")
plt.title('Correlation Matrix of Wellness Use and Selected Variables')
plt.show()

print("Correlation Matrix:")
print(corr_matrix)
```



Correlation Matrix:

	Wellness Used	Flight Risk	Loss Impact	Talent Assessment	2023 Performance Rating	Direct Reports
Wellness Used	1.000000	-0.021983	-0.049731	-0.058301	-0.053065	-0.092332
Flight Risk	-0.021983	1.000000	0.224858	-0.143743	0.074864	-0.003442
Loss Impact	-0.049731	0.224858	1.000000	-0.355085	0.327563	0.235452
Talent Assessment	-0.058301	-0.143743	-0.355085	1.000000	-0.246720	-0.173020
2023 Performance Rating	-0.053065	0.074864	0.327563	-0.246720	1.000000	0.202578
Direct Reports	-0.092332	-0.003442	0.235452	-0.173020	0.202578	1.000000

Exporting the correlation matrix to an Excel file with embedded image

In [10]:
```
!pip install xlsxwriter
```

```
Collecting xlsxwriter
  Downloading XlsxWriter-3.2.0-py3-none-any.whl.metadata (2.6 kB)
Downloading XlsxWriter-3.2.0-py3-none-any.whl (159 kB)
   ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 159.9/159.9 kB 4.1 MB/s eta 0:00:00
Installing collected packages: xlsxwriter
Successfully installed xlsxwriter-3.2.0
```

In [11]:
```
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
import os

# Define the columns for correlation analysis
cols_for_corr = ['Wellness Used', 'Flight Risk', 'Loss Impact', 'Talent Assessment'
                 '2023 Performance Rating', 'Direct Reports']

# Calculate the correlation matrix
corr_matrix = df[cols_for_corr].corr()

# Plot the correlation matrix using a heatmap
plt.figure(figsize=(10, 8))
sns.heatmap(corr_matrix, annot=True, cmap='coolwarm', fmt=".2f")
plt.title('Correlation Matrix of Wellness Use and Selected Variables')
plt.savefig("/kaggle/working/correlation_heatmap.png")  # Save the heatmap as PNG
plt.close()  # Close the plot to avoid display in the notebook

# Export the correlation matrix to an Excel file with embedded image
excel_file_path = "/kaggle/working/correlation_with_embedded_heatmap.xlsx"
with pd.ExcelWriter(excel_file_path, engine='xlsxwriter') as writer:
    # Write the correlation matrix to the Excel worksheet
    corr_matrix.to_excel(writer, sheet_name='Correlation Matrix')

    # Get the xlsxwriter workbook and worksheet objects
    workbook = writer.book
    worksheet = writer.sheets['Correlation Matrix']

    # Insert the heatmap image into the worksheet
    worksheet.insert_image('A10', '/kaggle/working/correlation_heatmap.png')

# Verify the files created
print("Contents of /kaggle/working directory:")
print(os.listdir("/kaggle/working"))

# Check if the file was created successfully
if os.path.isfile(excel_file_path):
    print(f"File created successfully: {excel_file_path}")
else:
    print("File creation failed.")
```

```
Contents of /kaggle/working directory:
['correlation_with_embedded_heatmap.xlsx', 'correlation_heatmap.png', '__notebook_
_.ipynb']
File created successfully: /kaggle/working/correlation_with_embedded_heatmap.xlsx
```

In [12]:
```
import matplotlib.pyplot as plt
import seaborn as sns
import pandas as pd
import os

# Define the columns for correlation analysis
cols_for_corr = df.columns[df.columns.get_loc('01 Explores Broadly and Innovates')
                           df.columns.get_loc('10 Demonstrates resilience and adapt
```

```python
# Calculate the correlation matrix
corr_matrix = df[cols_for_corr].corr()

# Include 'Wellness Used' column in the correlation analysis
cols_for_corr = ['Wellness Used'] + list(cols_for_corr)

# Calculate the correlation matrix
corr_matrix = df[cols_for_corr].corr()

# Plot the correlation matrix using a heatmap
plt.figure(figsize=(14, 12))
sns.heatmap(corr_matrix, annot=True, cmap='coolwarm', fmt=".2f")
plt.title('Correlation Matrix of Wellness Use and Other Variables')
heatmap_figure_path = "/kaggle/working/correlation_heatmap_1.png"
plt.savefig(heatmap_figure_path)
plt.close()  # Close the plot to avoid display in the notebook

# Define the file path for the Excel file
excel_file_path = "/kaggle/working/correlation_matrix_1_with_heatmap.xlsx"

# Export the correlation matrix to an Excel file with embedded heatmap
with pd.ExcelWriter(excel_file_path, engine='xlsxwriter') as writer:
    # Write the correlation matrix to the Excel worksheet
    corr_matrix.to_excel(writer, sheet_name='Correlation Matrix')

    # Get the xlsxwriter workbook and worksheet objects
    workbook = writer.book
    worksheet = writer.sheets['Correlation Matrix']

    # Insert the heatmap image into the worksheet
    worksheet.insert_image('A10', heatmap_figure_path)

# Verify the files created
print("Contents of /kaggle/working directory:")
print(os.listdir("/kaggle/working"))

# Check if the file was created successfully
if os.path.isfile(excel_file_path):
    print(f"File created successfully: {excel_file_path}")
else:
    print("File creation failed.")
```

```
Contents of /kaggle/working directory:
['correlation_with_embedded_heatmap.xlsx', 'correlation_heatmap.png', 'correlation
_heatmap_1.png', 'correlation_matrix_1_with_heatmap.xlsx', '__notebook__.ipynb']
File created successfully: /kaggle/working/correlation_matrix_1_with_heatmap.xlsx
```