### 1. INTRODUCTION

#### 1.1 Overview

Forecasting refers to the practice of predicting what will happen in the future by taking into consideration events in the past and present. Basically, it is a decision-making tool that helps businesses cope with the impact of the future's uncertainty by examining <a href="historical data">historical data</a> and trends. It is a planning tool that enables businesses to chart their next moves and create budgets that will hopefully cover whatever uncertainties may occur.

Budgeting and forecasting are both tools that help businesses plan for their future. However, the two are distinctly different in many ways:

- Budgeting involves creating financial statements for a specific period, such as projected <u>revenue</u>, expenses, cash flow and investments. It is usually conducted with input from many different departments, because it requires input from multiple departments in order to come up with a holistic and detailed report. Therefore, the budgeting process takes time to complete. The company uses the budget to guide it in its financial activities. In other words, a budget is a plan for a company's future.
- While budgets are usually made for an entire year, forecasts are usually updated monthly or quarterly. Through forecasting, a company can project where it's going, and it may adjust its budget and allocate more or less funds to an activity, depending on the forecast. In summary, budgets depend on the forecast.

# 1.2 Purpose

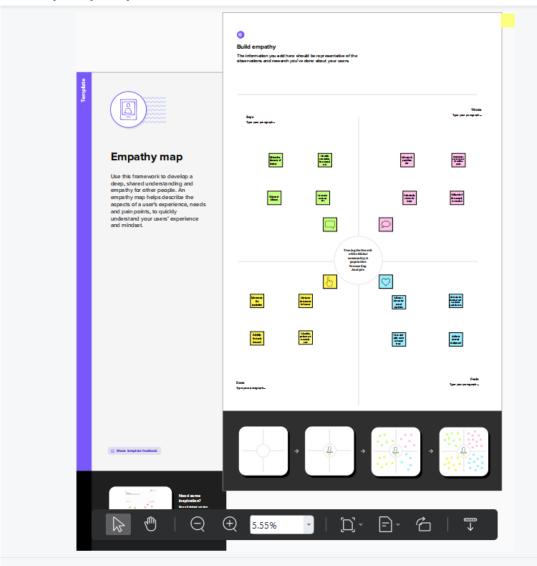
In the solution of any planning problem, the planner either makes an explicit forecast, or makes some implicit assumption about the population for which he is planning. "Population" includes much more than mere numbers of people. The planner must know what kind of people live in his planning area, what types of lives they lead, and would like to lead, how long they will live, and how long they will reside in the particular area; and who will replace them when they move out or die; how many children they will have (and would like to have under different conditions), whether these children will live in the area, and many other factors.

Many communities have installed facilities which have become useless because predicated on faulty estimates of future population, or they have failed to install facilities where justified by future population. A common example of such errors is the newly constructed school in an area where the population is aging rather than being replaced by young, child-bearing families. Sewer systems have

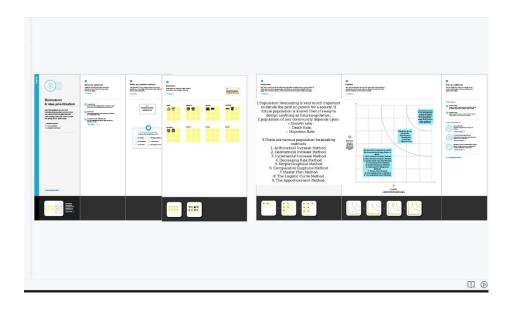
been expensively developed only to be later replaced because the population soon was double or triple what was anticipated for the area. Narrow streets have been later widened at great expense. On the other hand, land often has been overly zoned for commercial purposes in the expectation of a vast increase in population which did not materialize. Or land was zoned for potential capacities in some cities of whole state or even the entire population of the country. Prematurely subdivided land is plaguing many of our communities today.

### 2. Problem definition and Design Thinking

#### 2.1 Empathy map

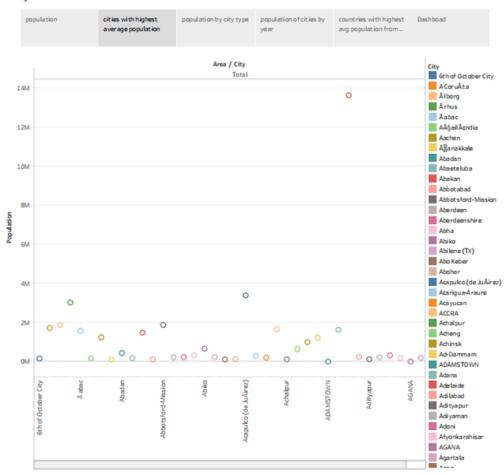


# 2.2 Ideation and Brainstorming Map

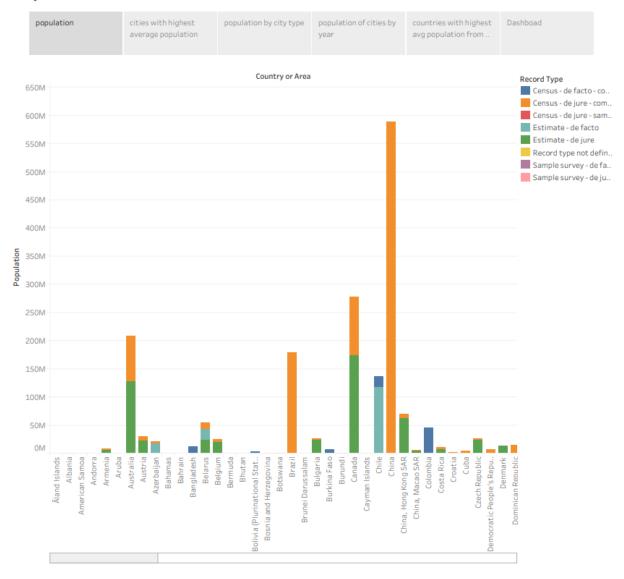


# 3. Results

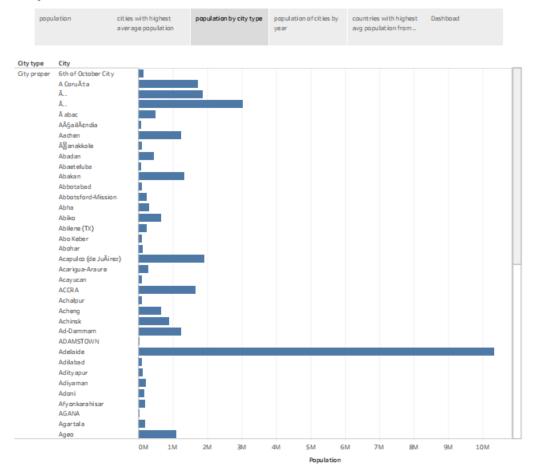
#### Story 1



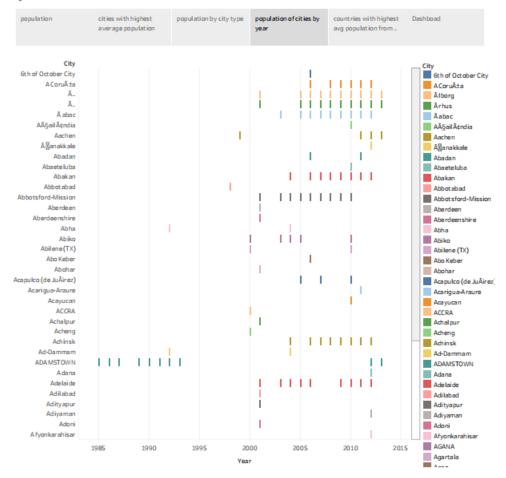
Story 1



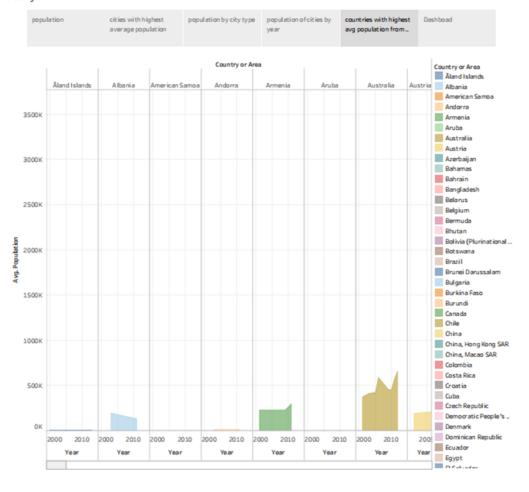
Story 1



Story 1



Story 1



# 4. Advantages and Disadvantages

# 4.1 Advantages

Many communities have installed facilities which have become useless because predicated on faulty estimates of future population, or they have failed to install facilities where justified by future population. A common example of such errors is the newly constructed school in an area where the population is aging rather than being replaced by young, child-bearing families. Sewer systems have been expensively developed only to be later replaced because the population soon was double or triple what was anticipated for the area. Narrow streets have been later widened at great expense. On the other hand, land often has been overly zoned for commercial purposes in the expectation of a vast increase in population which did not materialize. Or land was zoned for potential capacities in some cities of whole state or even the entire population of the country. Prematurely subdivided land is plaguing many of our communities today.

# 4.2 Disadvantage

### **MAJOR DIFFICULTIES IN FORECASTING**

Anticipating the numbers and characteristics of future population is very difficult. Since the planner is unable to fully foresee and therefore to predict future world social and economic conditions, he can only project what he thinks will happen to present trends in the future. He must make assumptions about the future, assumptions which may be outmoded or invalidated in a rapidly changing industrial society.

For the practising planner today there is another obstacle. The population analyst has generally been concerned with forecasting the future populations of whole countries, and diverse national trends tend to cancel out each other in the largeness of the figures. However, projection of population in small areas, such as county or city is a more difficult task, because an error in projection may not be balanced by another unforeseen event or influential factor, and because an error in projection may result in a variation important when compared to the small local total (although not important when compared to a national total). In addition, inand out-migration for the local area must be projected; this is no easy task. This is especially true for populations of large cities where the major element of population change has been migration. This is also especially true of certain sections of the country — some West Coast communities have doubled or trebled their populations in less than a decade.

In spite of all the obstacles, none of which can be underestimated, and all of which seem to announce the foolhardiness of any attempt, population projections must be made expertly enough so that the planner can perform his function planning for the future population of his area.

# 5. Application

Population forecasting is a method to predict/forecast the future population of an area. Usually, the population at the design period of water supply systems is predicted to find the water demand at that time, as the systems are required to fulfill their purposes till the end of the design period.

Population forecasting is a method to predict/forecast the future population of an area. Usually, the population at the design period of water supply systems is predicted to find the water demand at that time, as the systems are required to fulfill their purposes till the end of the design period.

#### 6. conclusion

Demography, the study of population, tries to find the answers to the questions of what types and numbers of persons can be expected to reside in an area at a future date. Population analysts have found that changes in population, the aspect most important to the planner, are related to other social and economic changes. The rate of industrialization and its effects on population growth is perhaps the most important relationship.

# 7. Future scope

This note outlines a method for forecasting life expectancy. The method is based on the idea of structured conditional probabilistic estimation; it "scopes" out the range of possibilities the future may hold. I first described this SCOPE method at a workshop organized by Juha Alho several years ago in Finland.Footnote1 It is a kind of scenario method — with probabilities attached to scenarios, with scenarios structured conditionally, and with the possibility of stochastic scenarios. It is a simple method, and it is by no means original; many other people have used a similar approach in various settings. This method might be helpful to those who want to forecast life expectancy. This note summarizes my present

# 8. Appendix

# 9. 8.1 HTML code for the output webpage

```
<meta name="viewport" content="width=device-width, initial-</pre>
scale=1">
             <meta name="keywords"</pre>
                  content="wrappixel, admin dashboard, html css dashboard, web
dashboard, bootstrap 5 admin, bootstrap 5, css3 dashboard, bootstrap 5
dashboard, Ample lite admin bootstrap 5 dashboard, frontend, responsive
bootstrap 5 admin template, Ample admin lite dashboard bootstrap 5 dashboard
template">
             <meta name="description"</pre>
                  content="Ample Admin Lite is powerful and clean admin
dashboard template, inpired from Bootstrap Framework">
              <meta name="robots" content="noindex,nofollow">
             <title>Global Population Timeseries Analysis</title>
              <link rel="canonical"</pre>
href="https://www.wrappixel.com/templates/ample-admin-lite/" />
             <!-- Favicon icon -->
              <link rel="icon" type="image/png" sizes="16x16"</pre>
href="plugins/images/favicon.png">
             <!-- Custom CSS -->
              link
href="plugins/bower_components/chartist/dist/chartist.min.css"
rel="stylesheet">
              <link rel="stylesheet" href="plugins/bower_components/chartist-</pre>
plugin-tooltips/dist/chartist-plugin-tooltip.css">
              <!-- Custom CSS -->
             <link href="css/style.min.css" rel="stylesheet">
         </head>
         <body>
             <!-- Preloader - style you can find in spinners.css -->
             <div class="preloader">
                 <div class="lds-ripple">
                      <div class="lds-pos"></div>
                      <div class="lds-pos"></div>
                 </div>
```

```
</div>
              <!-- Main wrapper - style you can find in pages.scss -->
              <div id="main-wrapper" data-layout="vertical" data-</pre>
navbarbg="skin5" data-sidebartype="full"
                  data-sidebar-position="absolute" data-header-
position="absolute" data-boxed-layout="full">
                  <!-- Topbar header - style you can find in pages.scss -->
                  <header class="topbar" data-navbarbg="skin5">
                      <nav class="navbar top-navbar navbar-expand-md navbar-</pre>
dark">
                          <div class="navbar-header" data-logobg="skin6">
                               <a class="navbar-brand" href="dashboard.html">
                                   <br/>
<br/>
class="logo-icon">
                                       <img src="plugins/images/logo-icon3.jpg"</pre>
alt="homepage" />
                                   </b>
                                   <!-- Logo text -->
                                   <span class="logo-text">
                                       <img src="plugins/images/logo-text5.png"</pre>
alt="homepage" />
                                   </span>
```

```
</a>
                           <!-- toggle and nav items -->
                           <a class="nav-toggler waves-effect waves-light</pre>
text-dark d-block d-md-none"
                               href="javascript:void(0)"><i class="ti-menu"</pre>
ti-close"></i></a>
                       </div>
                       <div class="navbar-collapse collapse"</pre>
id="navbarSupportedContent" data-navbarbg="skin5">
                           <!-- Right side toggle and nav items -->
                          items-center">
                               <!-- Search -->
                               class=" in">
```

```
<form role="search" class="app-search d-</pre>
none d-md-block me-3">
                                          <input type="text"</pre>
placeholder="Search..." class="form-control mt-0">
                                          <a href="" class="active">
                                              <i class="fa fa-search"></i></i>
                                          </a>
                                      </form>
                                  <!-- User profile and search -->
                                  <1i>>
                                      <a class="profile-pic" href="#">
src="plugins/images/users/smartinternz_thumb.png" alt="user-img" width="36"
                                              class="img-circle"><span</pre>
class="text-white font-medium">Anwar</span></a>
                                  <!-- User profile and search -->
                              </div>
                     </nav>
                 </header>
                 <!-- End Topbar header -->
                 <!-- Left Sidebar - style you can find in sidebar.scss
```

```
<aside class="left-sidebar" data-sidebarbg="skin6">
                   <!-- Sidebar scroll-->
                   <div class="scroll-sidebar">
                       <!-- Sidebar navigation-->
                       <nav class="sidebar-nav">
                          <!-- User Profile-->
                              <a class="sidebar-link waves-effect"
waves-dark sidebar-link" href="dashboard.html"
                                      aria-expanded="false">
                                      <i class="far fa-clock" aria-</pre>
hidden="true"></i>
                                     <span class="hide-</pre>
menu">Visualizations
                                 </a>
                              <a class="sidebar-link waves-effect</pre>
waves-dark sidebar-link" href="profile.html"
                                     aria-expanded="false">
                                      <i class="fa fa-user" aria-</pre>
hidden="true"></i>
                                     <span class="hide-</pre>
menu">Profile</span>
                                  </a>
                              <a class="sidebar-link waves-effect</pre>
waves-dark sidebar-link" href="story.html"
                                     aria-expanded="false">
                                      <i class="fa fa-table" aria-</pre>
hidden="true"></i>
                                     <span class="hide-menu">Story</span>
                                  </a>
```

```
<a class="sidebar-link waves-effect</pre>
waves-dark sidebar-link" href="dash1.html"
                                      aria-expanded="false">
                                       <i class="fa fa-table" aria-</pre>
hidden="true"></i>
                                       <span class="hide-</pre>
menu">Dashboard</span>
                                   </a>
                               <!-- <li>class="text-center p-20 upgrade-
btn">
href="https://www.wrappixel.com/templates/ampleadmin/"
                                      class="btn d-grid btn-danger text-
white" target="_blank">
                                      Upgrade to Pro</a>
                             </nav>
                      <!-- End Sidebar navigation -->
                   </div>
                   <!-- End Sidebar scroll-->
               </aside>
               <!-- End Left Sidebar - style you can find in
sidebar.scss -->
                <!-- Page wrapper -->
```

```
<div class="page-wrapper">
                     <!-- Bread crumb and right sidebar toggle -->
                    <div class="page-breadcrumb bg-white">
                        <div class="row align-items-center">
                            <div class="col-lg-3 col-md-4 col-sm-4 col-xs-</pre>
12">
                                <h4 class="page-title">Dashboard</h4>
                            </div>
                            <div class="col-lg-9 col-sm-8 col-md-8 col-xs-</pre>
12">
                                <div class="d-md-flex">
                                    <a href="#" class="fw-
normal">Dashboard</a>
                                    href="https://www.un.org/development/desa/pd/" target="_blank"
                                        class="btn btn-danger d-none d-md-
block pull-right ms-3 hidden-xs hidden-sm waves-effect waves-light text-
white">UN
                                        Website</a>
                                </div>
                            </div>
                        </div>
                        <div class='tableauPlaceholder'</pre>
id='viz1681953631560' style='position: relative'><noscript><a href='#'><img
alt='Dashboard 1 '
src='https://public.tableau.com/static/images/Da/Dash
board_16818866202410/Dashboard1/1_rss.png' style='border: none'
/></a></noscript><object class='tableauViz' style='display:none;'><param
name='host_url' value='https%3A%2F%2Fpublic.tableau.com%2F' /> <param</pre>
name='embed code version' value='3' /> <param name='site root' value=''</pre>
/><param name='name' value='Dashboard 16818866202410&#47;Dashboard1' /><param
name='tabs' value='no' /><param name='toolbar' value='yes' /><param</pre>
```

```
name='static image'
value='https://public.tableau.com/static/images/Da/Da
shboard_16818866202410/Dashboard1/1.png' /> <param
name='animate_transition' value='yes' /><param name='display_static_image'</pre>
value='yes' /><param name='display_spinner' value='yes' /><param</pre>
name='display_overlay' value='yes' /><param name='display_count' value='yes'</pre>
/><param name='language' value='en-US' /><param name='filter'</pre>
value='publish=yes' /></object></div>
type='text/javascript'>
                                          var divElement =
document.getElementById('viz1681953631560');
vizElement =
divElement.getElementsByTagName('object')[0];
divElement.offsetWidth > 800 ) {
vizElement.style.width='1000px';vizElement.style.height='827px';} else if (
divElement.offsetWidth > 500 ) {
vizElement.style.width='1000px';vizElement.style.height='827px';} else {
vizElement.style.width='100%';vizElement.style.height='1377px';}
        var scriptElement =
document.createElement('script');
                                                     scriptElement.src =
'https://public.tableau.com/javascripts/api/viz_v1.js';
                                                                           νi
zElement.parentNode.insertBefore(scriptElement,
vizElement);
                           </script>
                         <!-- Recent Comments -->
                     <!-- End Container fluid -->
                     <!-- footer -->
                     <footer class="footer text-center"> 2022 @ Smartinternz
brought to you by <a
                             href="https://www.thesmartbridge.com/">thesmartb
ridge.com</a>
                     </footer>
```

```
<!-- End footer -->
                 </div>
                 <!-- End Page wrapper -->
             </div>
             <!-- End Wrapper -->
             <!-- All Jquery -->
             <script
src="plugins/bower_components/jquery/dist/jquery.min.js"></script>
             <!-- Bootstrap tether Core JavaScript -->
             <script
src="bootstrap/dist/js/bootstrap.bundle.min.js"></script>
             <script src="js/app-style-switcher.js"></script>
             <script src="plugins/bower_components/jquery-</pre>
sparkline/jquery.sparkline.min.js"></script>
             <!--Wave Effects -->
             <script src="js/waves.js"></script>
             <!--Menu sidebar -->
             <script src="js/sidebarmenu.js"></script>
             <!--Custom JavaScript -->
             <script src="js/custom.js"></script>
             <!--This page JavaScript -->
             <!--chartis chart-->
```

```
<!DOCTYPE html>
<html dir="ltr" lang="en">
<head>
    <meta charset="utf-8">
    <meta http-equiv="X-UA-Compatible" content="IE=edge">
    <!-- Tell the browser to be responsive to screen width -->
    <meta name="viewport" content="width=device-width, initial-scale=1">
    <meta name="keywords"</pre>
        content="wrappixel, admin dashboard, html css dashboard, web dashboard,
bootstrap 5 admin, bootstrap 5, css3 dashboard, bootstrap 5 dashboard, Ample lite
admin bootstrap 5 dashboard, frontend, responsive bootstrap 5 admin template,
Ample admin lite dashboard bootstrap 5 dashboard template">
    <meta name="description"</pre>
        content="Ample Admin Lite is powerful and clean admin dashboard template,
inpired from Bootstrap Framework">
    <meta name="robots" content="noindex,nofollow">
    <title>Global Population Timseries Analysis</title>
    <link rel="canonical" href="https://www.wrappixel.com/templates/ample-admin-</pre>
lite/" />
   <!-- Favicon icon -->
    <link rel="icon" type="image/png" sizes="16x16"</pre>
href="plugins/images/favicon.png">
   <!-- Custom CSS -->
   <link href="css/style.min.css" rel="stylesheet">
    <!-- HTML5 Shim and Respond.js IE8 support of HTML5 elements and media
queries -->
    <!-- WARNING: Respond.js doesn't work if you view the page via file:// -->
    <!--[if lt IE 9]>
    <script
src="https://oss.maxcdn.com/libs/html5shiv/3.7.0/html5shiv.js"></script>
src="https://oss.maxcdn.com/libs/respond.js/1.4.2/respond.min.js"></script>
<![endif]-->
</head>
<body>
```

```
<!-- Preloader - style you can find in spinners.css -->
            <div class="preloader">
                         <div class="lds-ripple">
                                      <div class="lds-pos"></div>
                                      <div class="lds-pos"></div>
                         </div>
            </div>
             <!-- Main wrapper - style you can find in pages.scss -->
             <div id="main-wrapper" data-layout="vertical" data-navbarbg="skin5" data-
sidebartype="full"
                         data-sidebar-position="absolute" data-header-position="absolute" data-
boxed-layout="full">
                         <!-- Topbar header - style you can find in pages.scss -->
                         <header class="topbar" data-navbarbg="skin5">
                                      <nav class="navbar top-navbar navbar-expand-md navbar-dark">
                                                  <div class="navbar-header" data-logobg="skin6">
                                                                       <a class="navbar-brand" href="dashboard.html">
                                                                           <br/>
<br/>
documents of the content of the content
                                                                                        <!-- Dark Logo icon -->
                                                                                        <img src="plugins/images/logo-icon3.jpg"</pre>
alt="homepage" />
                                                                           </b>
                                                                           <span class="logo-text">
                                                                                        <!-- dark Logo text -->
                                                                                        <img src="plugins/images/logo-text5.png"</pre>
alt="homepage" />
                                                                           </span>
                                                              </a>
                                                              <!-- End Logo -->
```

```
<!-- toggle and nav items -->
                 <a class="nav-toggler waves-effect waves-light text-dark d-</pre>
block d-md-none"
                     href="javascript:void(0)"><i class="ti-menu ti-</pre>
close"></i></a>
              </div>
              <div class="navbar-collapse collapse" id="navbarSupportedContent"</pre>
data-navbarbg="skin5">
                 <a class="nav-toggler nav-link waves-effect waves-</pre>
light text-white"
                            href="javascript:void(0)"><i class="ti-menu ti-</pre>
close"></i></a>
                     <!-- Right side toggle and nav items -->
                 <!-- Search -->
                     class=" in">
                         <form role="search" class="app-search d-none d-md-</pre>
block me-3">
                            <input type="text" placeholder="Search..."</pre>
class="form-control mt-0">
                            <a href="" class="active">
                                <i class="fa fa-search"></i></i>
                            </a>
                         </form>
                     <!-- User profile and search -->
```

```
<
                                                                         <a class="profile-pic" href="#">
src="plugins/images/users/smartinternz_thumb.png" alt="user-img" width="36"
                                                                                             class="img-circle"><span class="text-white</pre>
font-medium">Anwar</span></a>
                                                              <!-- User profile and search -->
        </div>
                               </nav>
                     </header>
                     <!-- End Topbar header -->
                     <!-- Left Sidebar - style you can find in sidebar.scss -->
                     <aside class="left-sidebar" data-sidebarbg="skin6">
                               <!-- Sidebar scroll-->
                               <div class="scroll-sidebar">
                                         <!-- Sidebar navigation-->
                                         <nav class="sidebar-nav">
                                                   ul id="sidebarnav">
                                                              <!-- User Profile-->
                                                              <a class="sidebar-link waves-effect waves-dark"><a class="sidebar-link waves-effect waves-ef
sidebar-link" href="dashboard.html"
                                                                                   aria-expanded="false">
                                                                                   <i class="far fa-clock" aria-hidden="true"></i></i>
                                                                                   <span class="hide-menu">Visualizations</span>
                                                                        </a>
                                                              <a class="sidebar-link waves-effect waves-dark</pre>
sidebar-link" href="profile.html"
                                                                                   aria-expanded="false">
                                                                                   <i class="fa fa-user" aria-hidden="true"></i></i>
                                                                                   <span class="hide-menu">Profile</span>
                                                                        </a>
```

```
<a class="sidebar-link waves-effect waves-dark"><a class="sidebar-link waves-effect waves-ef
sidebar-link" href="story.html"
                                                                                                                                                                     aria-expanded="false">
                                                                                                                                                                     <i class="fa fa-table" aria-hidden="true"></i></i>
                                                                                                                                                                      <span class="hide-menu">Story</span>
                                                                                                                                                </a>
                                                                                                                            <a class="sidebar-link waves-effect waves-dark">
<a class="sidebar-link">

sidebar-link" href="dash1.html"
                                                                                                                                                                     aria-expanded="false">
                                                                                                                                                                     <i class="fa fa-table" aria-hidden="true"></i></i>
                                                                                                                                                                     <span class="hide-menu">Dashboard</span>
                                                                                                                                                </a>
                                                                                                                           </nav>
                                                              <!-- End Sidebar scroll-->
                                          </aside>
                                          <!-- End Left Sidebar - style you can find in sidebar.scss -->
                                          <!-- Page wrapper -->
                                          <div class="page-wrapper">
                                                              <!-- Bread crumb and right sidebar toggle -->
                                                              <div class="page-breadcrumb bg-white">
                                                                                   <div class="row align-items-center">
                                                                                                        <div class="col-lg-3 col-md-4 col-sm-4 col-xs-12">
                                                                                                                             <h4 class="page-title"> STORY</h4>
                                                                                                       </div>
                                                                                                       <div class="col-lg-9 col-sm-8 col-md-8 col-xs-12">
                                                                                                                             <div class="d-md-flex">
                                                                                                                                                 <a href="#" class="fw-
normal">Dashboard</a>
```

```
<a href="https://www.un.org/development/desa/pd/"</pre>
target=" blank"
                              class="btn btn-danger d-none d-md-block pull-
right ms-3 hidden-xs hidden-sm waves-effect waves-light text-white">UN
                              Website</a>
                       </div>
                   </div>
               </div><div class='tableauPlaceholder' id='viz1681953780621'</pre>
style='position: relative'><noscript><a href='#'><img alt='Story 1 '</pre>
src='https://public.tableau.com/static/images/st/story01
16818880617080/Story1/1 rss.png' style='border: none'
/></a></noscript><object class='tableauViz' style='display:none;'><param
name='host_url' value='https%3A%2F%2Fpublic.tableau.com%2F' /> <param</pre>
name='embed code version' value='3' /> <param name='site root' value='' /><param</pre>
name='name' value='story01_16818880617080/Story1' /><param name='tabs'</pre>
value='no' /><param name='toolbar' value='yes' /><param name='static_image'</pre>
value='https://public.tableau.com/static/images/st/story0
1_16818880617080/Story1/1.png' /> <param name='animate_transition'
value='yes' /><param name='display static image' value='yes' /><param
name='display_spinner' value='yes' /><param name='display_overlay' value='yes'</pre>
/><param name='display_count' value='yes' /><param name='language' value='en-US'
/><param name='filter' value='publish=yes'
/></object></div>
                               <script
type='text/javascript'>
                                         var divElement =
document.getElementById('viz1681953780621');
                                                             var vizElement =
divElement.getElementsByTagName('object')[0];
                                                              vizElement.style
.width='1016px';vizElement.style.height='991px';
scriptElement =
document.createElement('script');
                                                   scriptElement.src =
'https://public.tableau.com/javascripts/api/viz v1.js';
                                                                        vizEle
ment.parentNode.insertBefore(scriptElement, vizElement);
                                                                    </script>
               <!-- End PAge Content -->
<!-- Right sidebar -->
               <!-- .right-sidebar -->
           </div>
```

```
<!-- End Container fluid -->
            <!-- footer -->
            <footer class="footer text-center"> 2022 @ Smartinternz brought to
you by <a
                    href="https://www.thesmartbridge.com/">thesmartbridge.com</a>
            </footer>
            <!-- End footer -->
        </div>
        <!-- End Page wrapper -->
   </div>
    <!-- End Wrapper -->
    <!-- All Jquery -->
    <script src="plugins/bower_components/jquery/dist/jquery.min.js"></script>
    <!-- Bootstrap tether Core JavaScript -->
    <script src="bootstrap/dist/js/bootstrap.bundle.min.js"></script>
    <script src="js/app-style-switcher.js"></script>
    <!--Wave Effects -->
    <script src="js/waves.js"></script>
    <!--Menu sidebar -->
    <script src="js/sidebarmenu.js"></script>
    <!--Custom JavaScript -->
    <script src="js/custom.js"></script>
</body>
</html>
```