Power BI Questions (Performance Management)

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2021-04-14

POWER BI QUESTIONS (PERFORMANCE MANAGEMENT)

Question 1

In 2010 Gaspar opened a new delicatessen in Halifax called Mil Alimentos. The deli sells a wide variety of food products from around the world, such as spices, cheeses, sauces, and breads. His research before opening the deli indicated that immigration to Halifax would continue to grow and consumer tastes were becoming more multicultural, with people exploring new foods. While his strategy focuses more on a delicatessen niche market, Gaspar wanted to know the opportunities for sales to those with non-European or North American ethnic backgrounds. He feels he can set revenue growth targets of 20% per month for the first six years of operations.

Gaspar has asked you to help him with a strategic evaluation of his deli. He would like to know more about how the competitive environment in other parts of Canada compare to Nova Scotia and especially how Halifax has evolved. Most important, he would like to know if there is opportunity for growth in Halifax. His son-in-law started the analysis of the competitive environment by downloading information from a variety of sources and sketching out a dashboard with details he thought would be helpful.

The information downloaded consisted of the following:

- Ethnic population for Halifax, Saskatoon, Edmonton, and Victoria for 2011 and 2016. This data was sourced from Statistics Canada and revised to suit the purposes of the situation
- Actual revenues from delicatessens specializing in ethnic foods, in comparison to demand. Actual revenues were taken from government statistics. Demand for ethnic food statistics were extrapolated from social networking sites and marketing data. A positive variance between demand versus revenues indicate an unfilled demand for ethnic foods. A negative variance meant that there was no excessive demand for ethnic foods. The negative variance likely means that the additional ethnic deli revenues were from customers that were simply purchasing from the deli for convenience.
- The five most popular cuisine types by province. This data was taken from Google Trends and organized by province by a food networking blog.

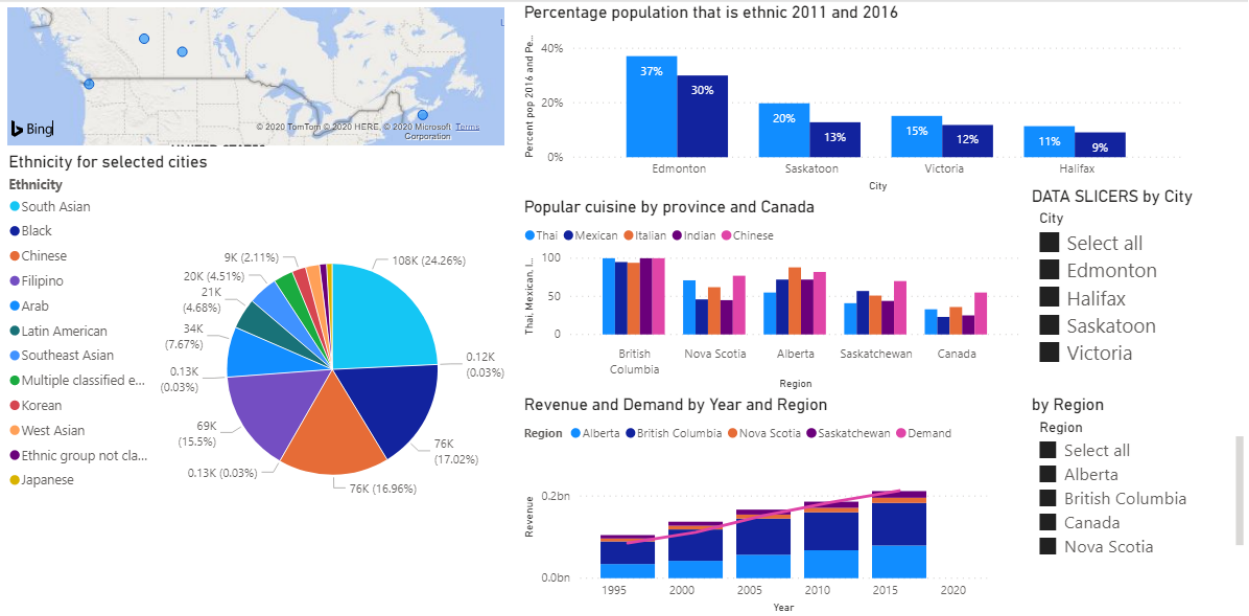
The following is a layout of the table formats:

Ethnicity by city	
VARIABLE NAME	**FORMAT**
City	Text
Ethnicity	Text
2011 Number	999,999
2011 Median age	999
2016 Number	999,999
2016 Median age	999

Region DATA	
VARIABLE NAME	**FORMAT**
Region	Text (Province)
Year	YYYY
Demand	$999,999,999
Revenue	$999,999,999

Popular cuisine	
VARIABLE NAME	**FORMAT**
Region	Text (Province)
Mexican	999
Indian	999
Thai	999
Italian	999
Chinese	999

Gaspar approved the following preliminary “sketch” of the dashboard:



Required:

a) Prepare a dashboard using the information provided in the scenario and the instructions provided in the appendix. Use the dashboard to answer the following:

   i. Describe the data trends as they relate to major ethnicities and overall growth in ethnic populations in the four cities. Focus on the charts “2016 Ethnicity for selected cities” and “Percent population that is ethnic 2011 and 2016”.

   ii. Review the chart “Revenue in comparison to demand 1996-2016”. Based on the data, which province(s) have an opportunity for growth? Identify what type of cuisine should be the focus of each those provinces where an opportunity for growth can be identified.

   iii. Provide a summary recommendation to Gaspar focusing on changes in any of the factors on which the original strategy was formed. State any further steps that should be taken to move forward with this recommendation.

   iv. Be skeptical of the data. Comment on the validity of each table and the risks of invalid data in this situation.

b) Explain how you would undertake monitoring and evaluating your strategic objectives.

Appendix

If you are new to Power BI it may be helpful to view the following tutorials:

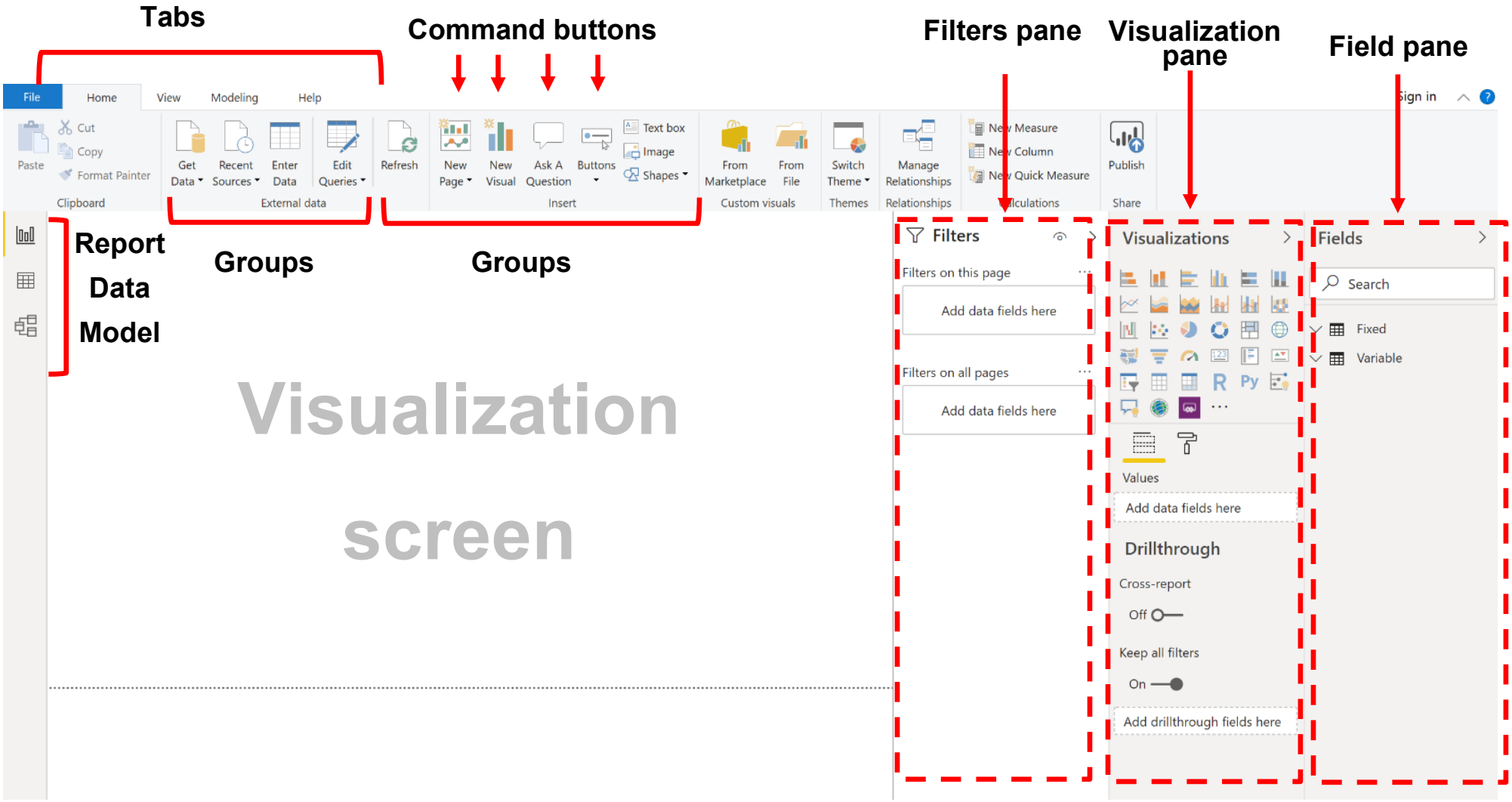
- Getting data: https://docs.microsoft.com/en-ca/learn/modules/get-data-power-bi/index
- Creating and customizing simple visuals: https://docs.microsoft.com/en-ca/learn/modules/visuals-in-power-bi/2-create-simple-visuals

These tutorials will also assist with some of the details (formatting, colour, layout, and so on) that are not explained in the following steps.

The screen layout on the next page is based on Power BI, Version: 2.79.5768.1082 64-bit (March 2020), so your visualization may look slightly different. The terms illustrated on the next page will be used throughout the tutorial.

SCREEN LABELING CONVENTIONS

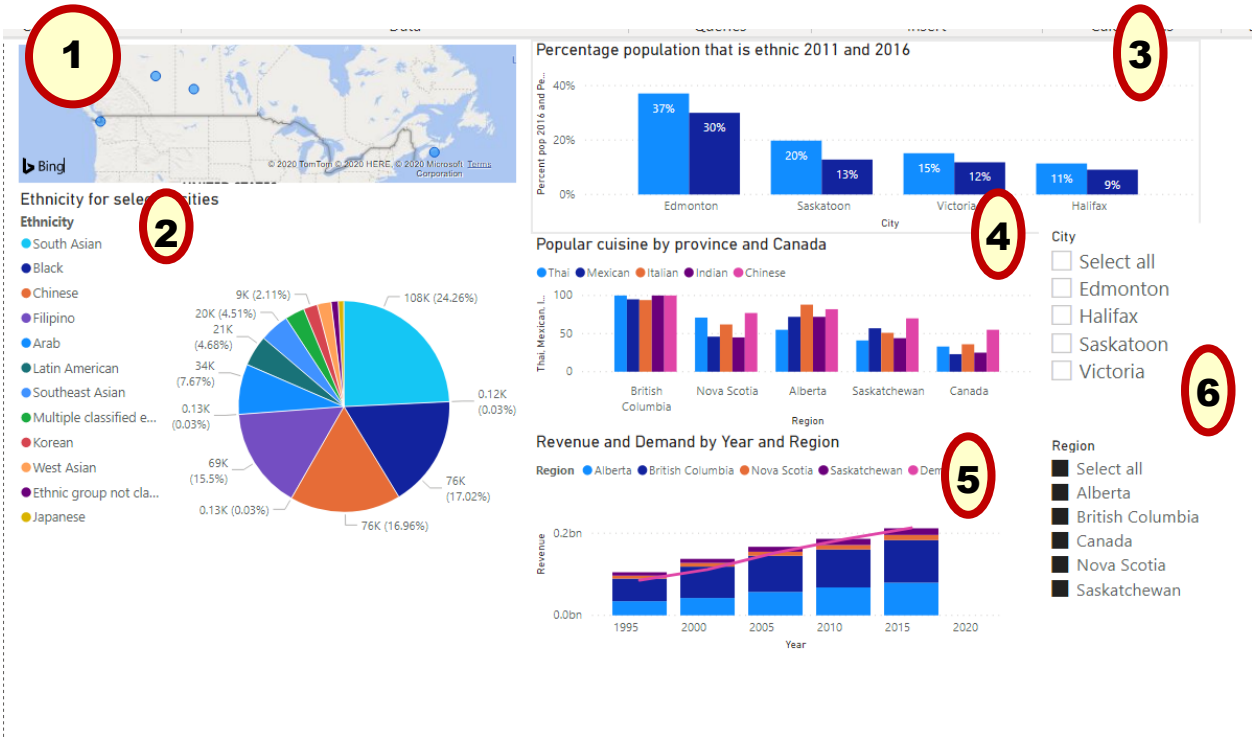
The following illustration identifies the naming conventions used to explain the steps required to produce the visualization.



This dashboard uses the PMA-QUESTION.1.pbix (Power BI) file, which consists of three tables with the following table structures. (This layout can be seen in Power BI by selecting the Model icon on the left-hand side of the visualization screen).

The .pbix file format is a Power BI file. The data in this type of file is often imported from a variety of sources such as a corporate database and external databases. For strategy development and environmental scanning, most data comes from external sources. The strategy evaluation phase will often compare actual corporate results from a corporate database with actual market results. These results can be taken from Statistics Canada or reputable marketing companies at a price. For purposes of the scenario in this question, the “Ethnicity by city” table data was taken from Statistics Canada and repurposed for this question, the “Popular cuisine” table data was sourced from *The Chef’s Pencil* online via Google Trends. The “Region DATA” could also be taken from Statistics Canada, but in this case was fabricated for the scenario. However, given an actual situation, the Demand field could have been taken from social networking sites, such as Facebook, where many users express their preferences. This data could be used to determine the market for consumers of ethnic delicatessen food.

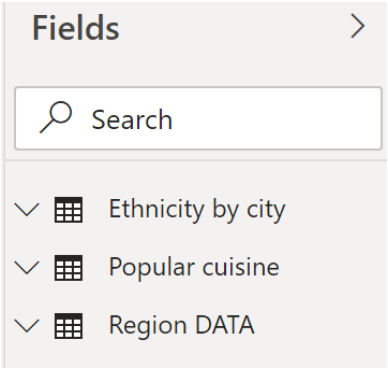
The tasks given in the required section of the question are broken into steps. The following exhibit highlights where each of the steps will show on the visualization referenced by numbers.



This dashboard is based on the PMA-QUESTION.1.pbix file.

Getting started

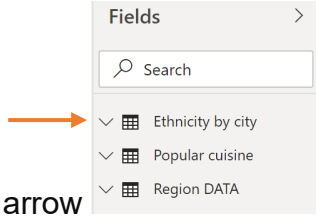
- Open the file PMA-QUESTION.1.pbix. This file contains all the table information that was imported from various sources.
- After you open the file, you should see the following three table names on the Fields pane:

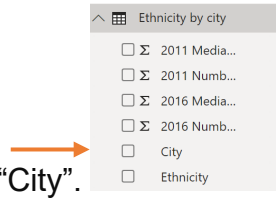


Step 1: Populate the Map visualization tool with Canadian cities.

- Click on the Map visualization in the Visualization pane. Hint: you can hover over the icon and the name will appear.

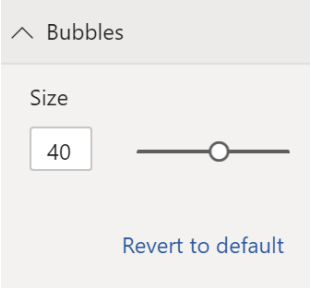
- This diagram will appear on the Visualization screen. Click on the map, and ensure the grey box is highlighted.

- Click on the down arrow 

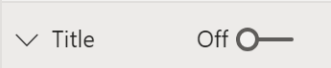
beside the “Ethnicity by city” table in the Fields pane and select the variable “City”. 

The map will populate with the city names in the appropriate spot on the Canadian map.

- Click on the formatting tool on the Visualization pane, scroll down the formatting information, and select Bubbles. Change the size to 40.



This increases the size of the dots on the map.

- Scroll further down until you see 

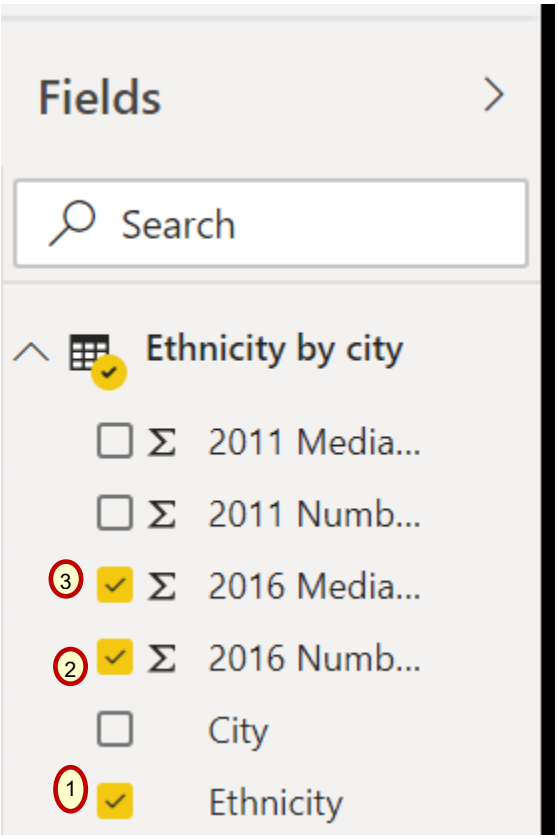
. Set the toggle to “Off” to reduce the clutter of headings. You can play around with the size of the map to focus on Southern Canada where all the cities are located.

Step 2: Create the pie chart to show proportion of ethnicity by city.

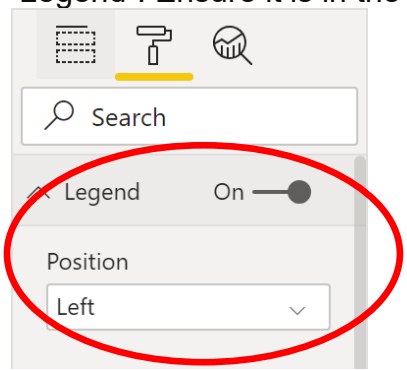
- First click outside the box of the newly created map visualization.

- Click on the pie chart icon on the Visualization pane.

- In the “Ethnicity by city” table on the Fields pane, click (in order) on the following fields:



- Click on the formatting tool on the Visualization pane and scroll down to "Legend". Ensure it is in the "On" position. Then, under "Position", select "Left".



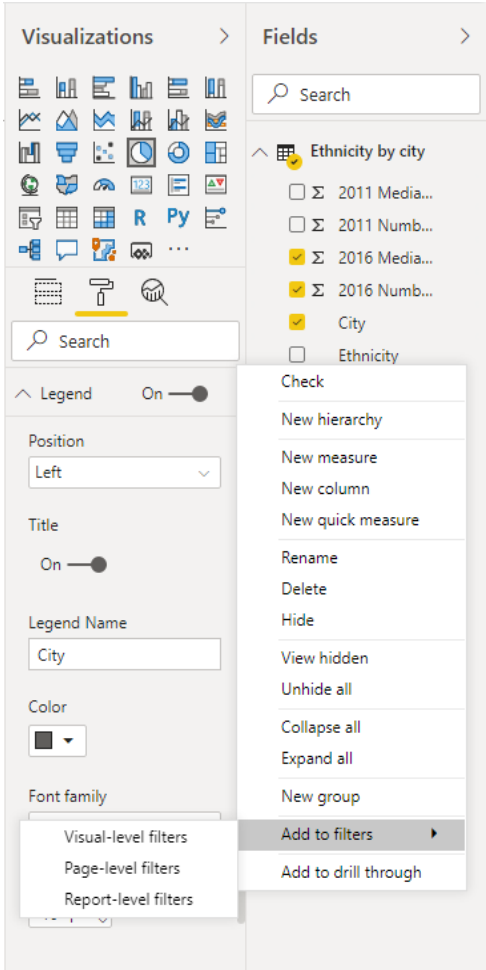
- Stretch the chart so that the descriptions are showing on the left-hand side.
- Using the formatting tool, change the title to read Ethnicity for selected cities.

Below is a portion of the data from the "Ethnicity by city" table.

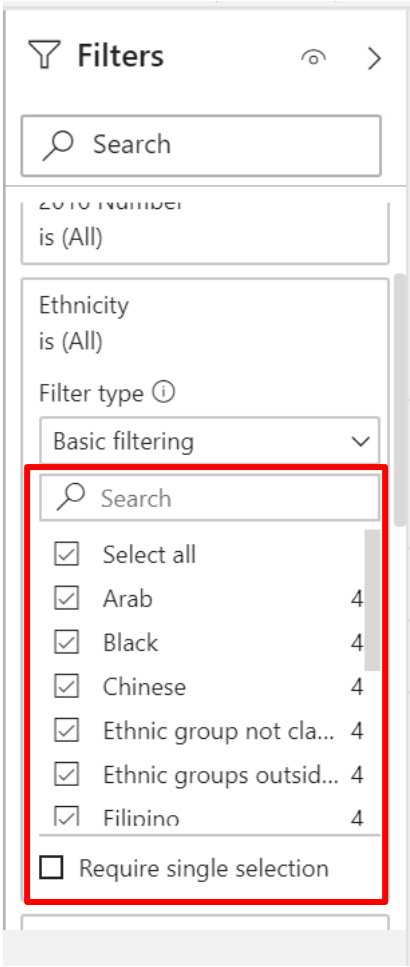
City	Ethnicity	2011 Number	2011 Median age	2016 Number	2016 Median age
Halifax	South Asian	3,990	30.9	6,555	30
Halifax	Chinese	4,620	25.5	6,975	25.1
Halifax	Black	13,780	28	15,090	27.3
Halifax	Filipino	1,320	30	2,575	32.3
Halifax	Latin American	1,025	34.1	1,210	36
Halifax	Arab	5,525	26.4	7,340	26.8
Halifax	Southeast Asian	900	44	865	30.6
Halifax	West Asian	1,205	33.9	1,395	33
Halifax	Korean	845	28.2	1,230	32.1
Halifax	Japanese	290	31.4	485	23.1
Halifax	Ethnic group not classified[1]	445	20	495	29.5
Halifax	Multiple classified ethnic groups[2]	1,090	23.9	1,095	22.4
Halifax	Ethnic groups outside of research[3]	349,500	40.7	352,345	42.7

[1]Includes small population groups that are non-European or North American whose ethnic groups were not classified separately
[2]Includes individuals who identified with more than one of the ethnic groups in the research
[3]People belonging to ethnic groups outside the research (European and North American)

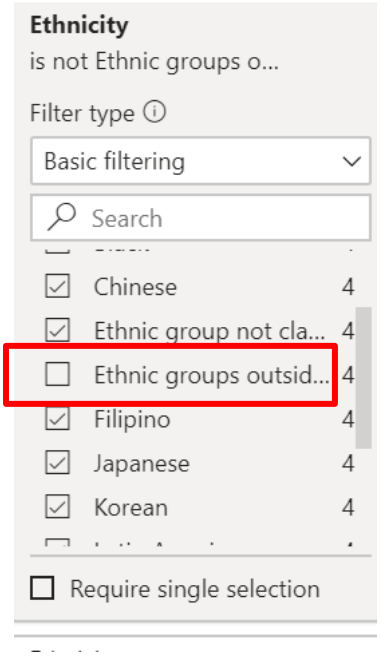
- Along with a listing of data for each ethnic group is an entry called “Ethnic groups outside of research”. This field represents the portion of the population that is not being researched for this analysis. The population figure related to this group should not be included in the pie chart illustration, so only ethnic groups that are non-North American and non-European are displayed. To remove this figure, hover your mouse over “Ethnicity” under Ethnicity by city in the Fields pane, then click on the three dots that appear and select “Add to Filters →Visual-level filter”.



- Then make sure the “Filter pane” (beside the visualization screen) is revealed.
- Scroll down until you see the “Ethnicity is (All)” filter. When you click on it, the following options will be displayed (make sure the pie chart is selected in the visualization screen area):



Make sure all fields are selected, then scroll down the fields and deselect the “Ethnic groups outside of research” field. This will allow the pie chart to focus only on the ethnic group populations specific to this research.



Step 3: Prepare the clustered column chart illustrating the percentage of the population that is ethnic for 2011 and 2016.

The purpose of the clustered column chart is to illustrate the percentage of the total population that is ethnic in 2011 and in 2016. The data in the file lists the populations by ethnic and non-ethnic groups as shown above in the portion of the data from the "Ethnicity by city" table.

To calculate the percentage of the total population that is ethnic also requires that the "Ethnic groups outside of research" population be removed from the total. This is the numerator of the equation. This is done for both 2011 and 2016 by creating a "measure" — a formula that is recorded as a field in a table.

- To create the measure, in the Fields pane, click on the three dots ... beside the "Ethnicity by city" table name and select "New Measure".

  At the top of the visualization screen a formula bar will appear:

  Remove "Measure =" and type the following formula:

```
Percent pop 2011 = CALCULATE(sum('Ethnicity by city'[2011
Number]),'Ethnicity by city'[Ethnicity]<>"Ethnic groups outside of
research")/sum('Ethnicity by city'[2011 Number])
```

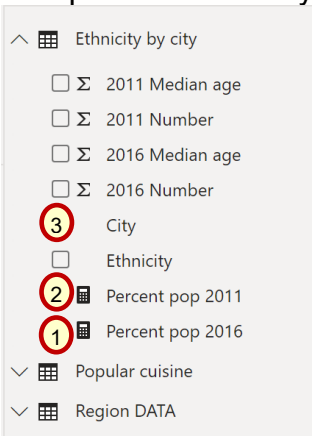
  Press enter.

This measure represents the percentage of the total population that is a part of the ethnic group populations being researched for each of the cities in the analysis. Note that it removes the “Ethnic groups outside of research” variable from the numerator and then divides the result by the sum of the “2011 Number” field.

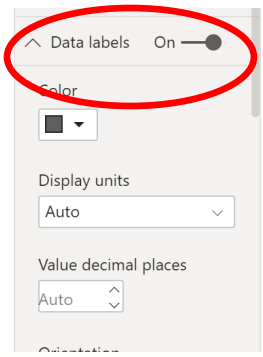
- Now repeat this step by creating another measure using 2016 instead of 2011 in the equation and call the measure “Percent pop 2016” instead of “Percent pop 2011”.

The “Ethnicity by city” table should now have the following additional fields:

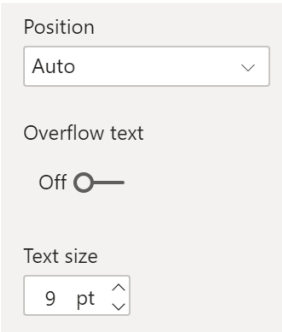
- Click on the clustered column chart icon on the Visualization pane.
- Complete the chart by selecting the fields in the following order:



- To add some visual interest, click on the formatting tool on the Visualization pane and scroll down to “Data labels”. Ensure that it is on the “On” position.

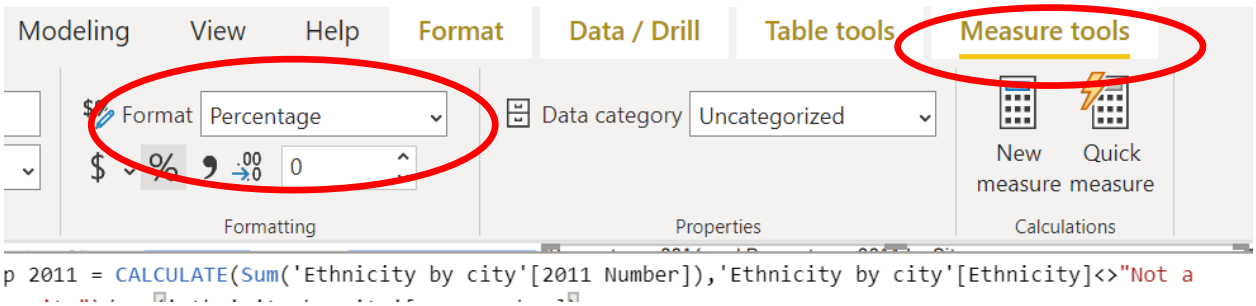


Then scroll down to the section that shows the label position and text size.



Change the Position to “Inside end” and the text size so it is easy to read. If the label is showing as a decimal, for each of the measures you created in the “Ethnicity by city” table, do the following:

- Click on each of the new measures you have created in the Fields pane. A “Measure tools” tab should show at the top of the screen.
- Under the “Formatting” group, select the dropdown box highlighted below and change to “Percentage”. The number of decimals can also be selected here.



- Finally, using the formatting tool, change the title to read Percentage population that is ethnic 2011 and 2016.

Step 4: Prepare the clustered column chart illustrating the popular cuisine by province.

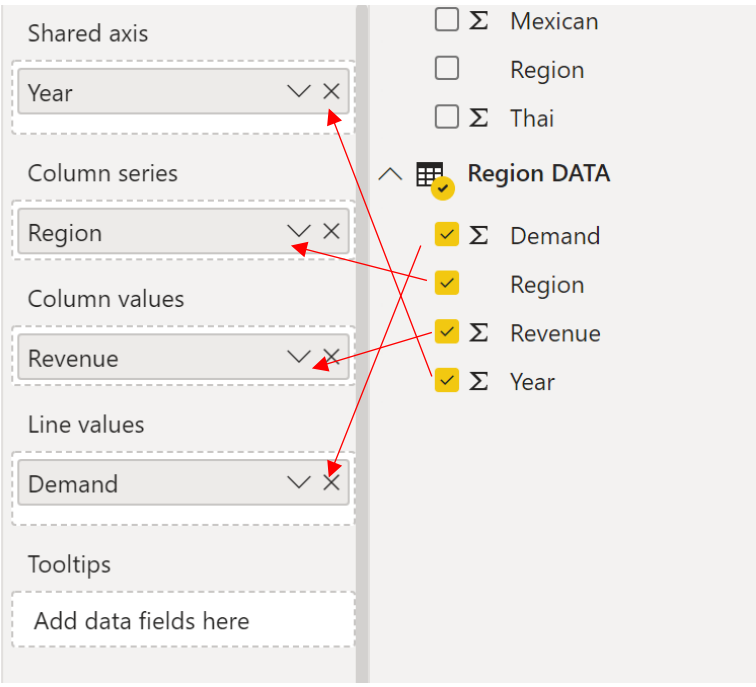
- First click outside the box of the newly created clustered column chart.

- Then click on the clustered column chart icon on the Visualization pane.
- Select the fields on the “Popular cuisine" table — first “Region”, then all five popular cuisines in any order:

- Using the formatting tool, change the title to read Popular cuisine by province and Canada.

Step 5: Prepare a line and stacked column chart for demand vs revenue analysis.

- First click outside the box of the newly created clustered column chart.
- Then click on the line and stacked column chart icon on the Visualization pane.
- Select the “Region DATA” table. Click and drag the fields on the Fields pane to the slots indicated on the Visualization pane.

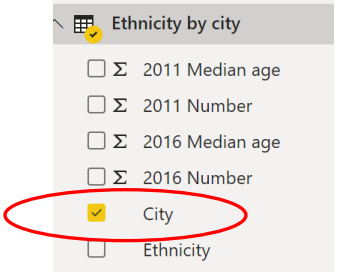


Note that the chart is designed to compare actual revenue growth from existing ethnic delis in comparison to what the demand could be, given results of polling social media. In the next step you will create a slicer to view this information by city and province.

Step 6: Create two slicers to view data by city and by province.

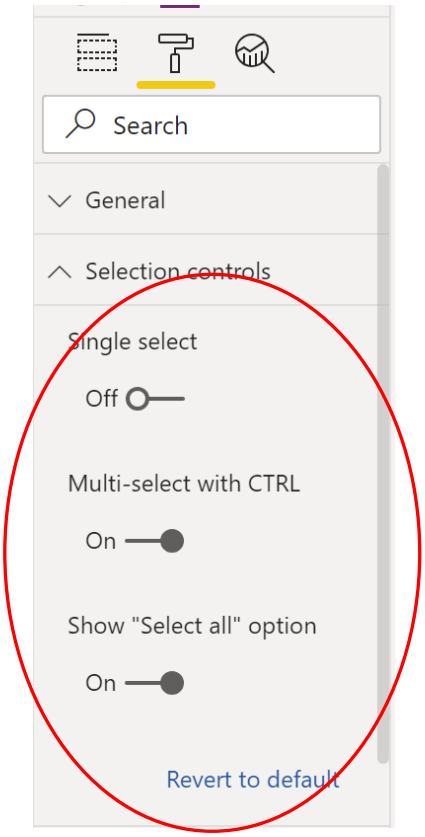
VIEW DATA BY CITY: At this point the dashboard displays data for all cities and provinces in the data set. Building in interactivity with a Slicer allows the user to view different subsets of the data. As a selection is made on the slicer, the visualization will change. Points on the visualization will show details of the data, such as the demand in a certain province in a certain year, when the cursor hovers over a data point.

- First, click outside the box of the newly created line and stacked column chart.
- Click on the slicer icon on the Visualization pane.
- Select “City” from the “Ethnicity by city” table as follows:



The slicer should display the four cities that are part of the dashboard.

- For ease of use, set the following selection slicer controls using the formatting tool:
  - Under Selection controls, ensure that the “Single select” control is turned off. This allows the user to include more than one city in the analysis.
  - The Multi-select with CRTL control should be set to “On”. This allows the user to select more than one city by holding down the CTRL key.
  - The “Show ‘Select all’ option” control should be set to “On” to allow selection of all cities. This also helps to clear the visualization screen for the next slice.



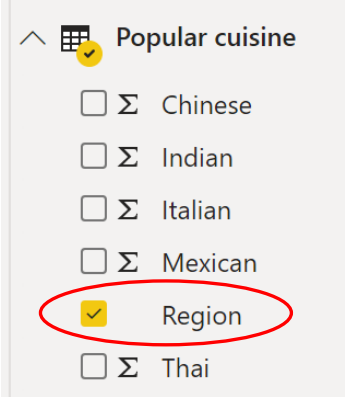
- Try out the slicer by selecting “Edmonton”. All charts using the “City” field on the dashboard will now adjust to show only data relating to Edmonton.

VIEW DATA BY PROVINCE: All visualizations that use the “Region” field can be controlled by province when another slicer is added.

- First click outside the box of the newly created City slicer.

- Click on the slicer icon on the Visualization pane.

- Select “Region” from the “Popular cuisine” table as follows:



- As with the City slicer, for ease of use set the following selection controls:
  - Ensure that the “Single select” control is turned to off. This allows the user to include more than one province in the analysis.
  - The “Multi-select with CTRL” control should be set to “On”. This allows the user to select more than one province by holding down the CTRL key.
  - The “Show ‘Select all’ option” control should be set to “On” to allow selection of all provinces. This helps to clear the visualization screen for the next slice.

Note that the “Canada” region control does not illustrate anything in the stacked bar and line chart as there is no data supplied for that function.

Also note that this step-by-step tutorial does not cover the formatting of titles or sketching the dashboard out in exactly the same presentation as was given in the notes. It is suggested that you explore the formatting tool on the Visualization pane to learn more about formatting, as well as to consider the best way of presenting the data.

Question 2

Guilio is preparing for a summer strategy-planning retreat. He has asked you to assist with developing a means by which EFI can continue to monitor the strategic environment. Due to a slowing growth rate, Guilio is open to exploring other markets (snowboarding or cross-country skiing) in which EFI could expand its product offerings. Guilio would also like to know more about current spending around ski accessories across the provinces. This would include poles, goggles, gloves, and outerwear.

Ultimately, he would like an interactive information system that would provide updates on recent statistics as they relate to the ski industry. For now, you have access to the

2014-15 data from the “Facts+Stats” provided by the Canadian Ski Council along with other data that will be useful for this preliminary analysis.

Required:

a) Prepare a dashboard using Power BI that provides an overview of the Canadian ski industry and the spending habits of skiers. The appendix at the end of this project provides instructions on where to find the data and create the dashboard using Power BI.

b) Using the dashboard, discuss the following:

   i. Growth in the ski and snowboarding industry across Canada. Provide any observations you feel are necessary to address Guilio’s requests.

   ii. The ski accessory spending habits of Canadian skiers. Relate this to EFI’s current plan to diversify into ski accessories.

c) From the part b) discussion, highlight one point that you feel should be explored at the strategy-planning retreat and explain why.

d) Identify two additional data sets that could be integrated into this dashboard to help in EFI’s strategic planning. Briefly discuss how this data could assist.

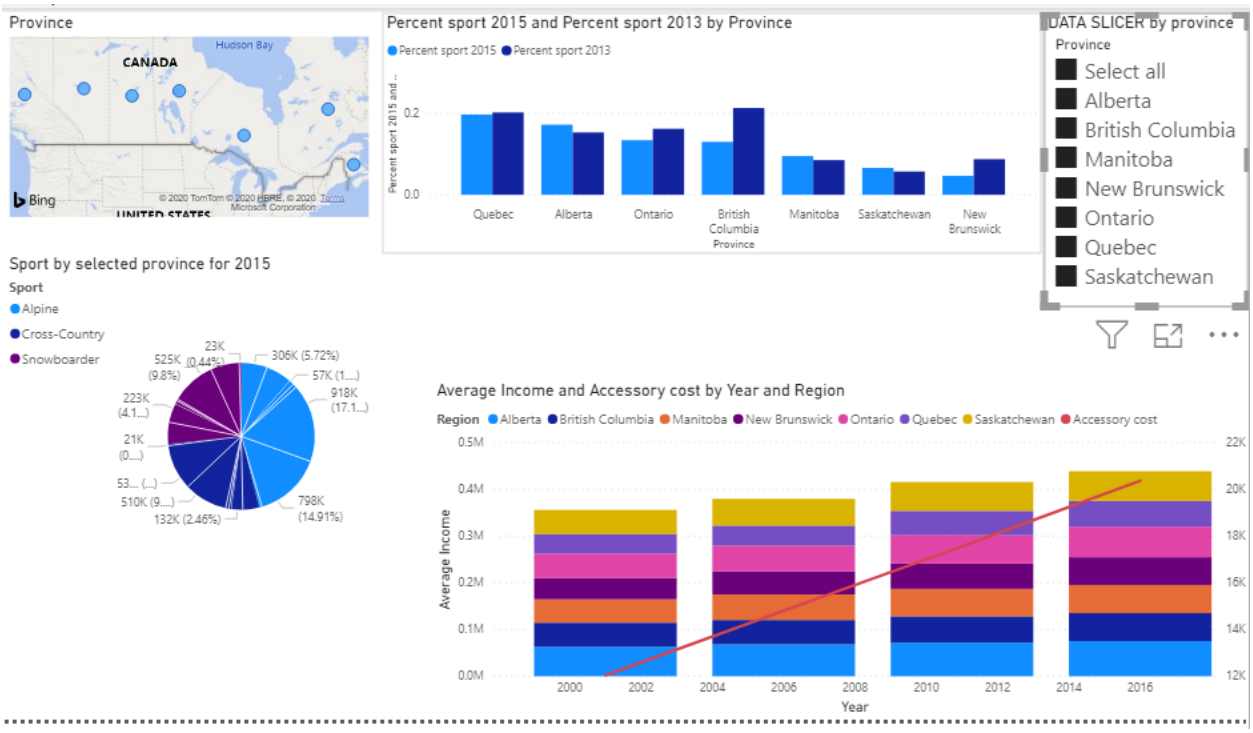
NOTE: Insert into your project solution a screen shot of the completed dashboard. Additionally, use screen shots of the dashboard to reinforce your discussion points if necessary.

While the dashboard must consist of all elements displayed, the visualizations within the dashboard and the formatting will vary.

Appendix

The dashboard to be developed in this part of the project is based on the dashboard developed in Question 1. The instructions provided here assume that you have already successfully completed the Question 1 data dashboard.

The following dashboard consists of the components to be completed for this part of the project:



The following is a layout of the table formats:

Activity by province	
VARIABLE NAME	**FORMAT**
Province	Text
Sport	Text
2013 number	999,999
2013 median age	999
2015 number	999,999
2015 median age	999

Spending	
VARIABLE NAME	**FORMAT**
Region	Text (Province)
Year	YYYY
Accessory	$999,999,999
Average income	$999,999,999

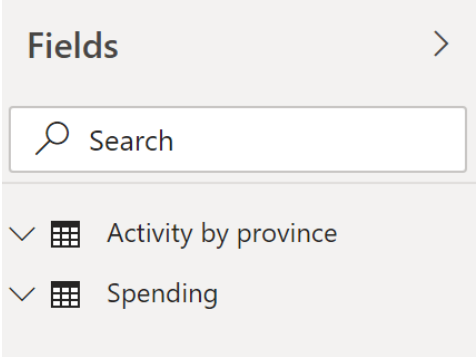
The data for the “Activity by province” table was taken and adapted from the 2014-15 Facts+Stats publication by the Canadian Ski Association[1]. The average income data for the “Spending” table is based on Statistics Canada average income, which was increased by an approximate percentage to reflect the assumption that the average

[1] https://www.skicanada.org/wp-content/uploads/2016/01/2014-15-Facts-and-Stats.pdf, Accessed April 29, 2020

skier/snowboarder is in a higher income bracket. Accessory spending was estimated for the purposes of this assignment.

Getting started:

- Open the file PMA-QUESTION.2.pbix. This file contains all table information that was imported from the sources mentioned above.
- After you open the file, you should see the following two table names on the Fields pane.



Step 1: Populate the Map visualization tool with Canadian Provinces.

Select “Province” from the “Activity by province” table. Change the size of the location bubbles on the map to “40” to increase the size of the dots on the map.

Step 2: Create the Pie chart to show the proportion of participants in ski and snowboarding sports in each province.

Select “Activity by province” table fields in the following order:

- Sport
- Province
- ∑ 2015 number

Format the legend for the chart.

The data for this visualization consists of the following for each province:

Province	Sport	2013 number	2013 Median age	2015 number	2015 Median age
New Brunswick	Alpine	43,333.0	37	48,540.0	38
New Brunswick	Snowboarder	21,000.0	27	20,629.0	30
New Brunswick	Cross-Country	37,667.0	41	38,832.0	43
New Brunswick	Non-skier	1,065,167.0	41	2,210,997.0	45

- Along with a listing of data for each winter sport is an entry called “Non-skier”. This field represents the portion of the population that does not participate in the other, defined winter sports. The population figure related to this group should not be included in the pie chart illustration, so only the specific winter sport participants of interest are visible. To remove this figure, make sure the “Filter pane” (beside the visualization page) is revealed.

  Then, scroll down until you see the “Sport is (All)” filter. With no filter or if “Select all” is clicked, all fields in the “Activity by province” pie chart are shown. Make sure “Select all” is checked, then scroll down the fields and deselect the “Non-skier” field. This will allow the pie chart to focus only on the population that participates in ski and snowboard sports.

Step 3: Prepare the clustered column chart illustrating the percentage of the population that participates in ski and snowboard sports for 2013 and 2015.

The purpose of the chart is to compare the percentage of the total province population that participates in skiing and snowboarding. As illustrated above, the data in the file lists the populations by the sport in which each population group participates as well as a group for “Non-skiers”.

To calculate the percentage of the ski and snowboard population versus the entire population also requires that the “Non-skier” population be removed from the total. This is the numerator of the equation. This is done for both 2013 and 2015 by creating a “measure”.

To create the measure, in the Fields pane, click on the three dots beside the “Activity by province” table name and select “New Measure”.

Enter the following measures:

- To calculate the 2013 percentage:
  ```
  Percent sport 2013 = CALCULATE(sum('Activity by province'[2013 number]),'Activity by province'[Sport]<>"Non-skier")/sum('Activity by province'[2013 number])
  ```
- To calculate the 2015 percentage:
  ```
  Percent sport 2015 = CALCULATE(sum('Activity by province'[2015 number]),'Activity by province'[Sport]<>"Non-skier")/sum('Activity by province'[2015 number])
  ```
- Next, click on the clustered column chart icon on the Visualization pane.

- Complete the chart by selecting the fields in the “Activity by province” table in the following order:
  1. Percent sport 2015
  2. Percent sport 2013
  3. Province
- Change the data labels to show inside end and to show as percentages.

Step 4: This step is omitted in this project as data for a second cluster column chart is not included in for the project.

Step 5: Prepare a line and stacked column chart for accessory spending versus average income analysis.

Click and drag the fields on the Fields pane to the slots indicated on the Visualization pane as follows:

Field	**To Visualization pane**
Spending[∑ Year]	Shared axis
Activity by province[Province]	Column series
Spending[∑Average income]	Column values
Spending[∑Accessory cost]	Line values

Note that the chart is designed to compare average income to what a skier will spend on accessories. In the next step a slicer is created to view all information by province.

Step 6: Create a Slicer to view data by province.

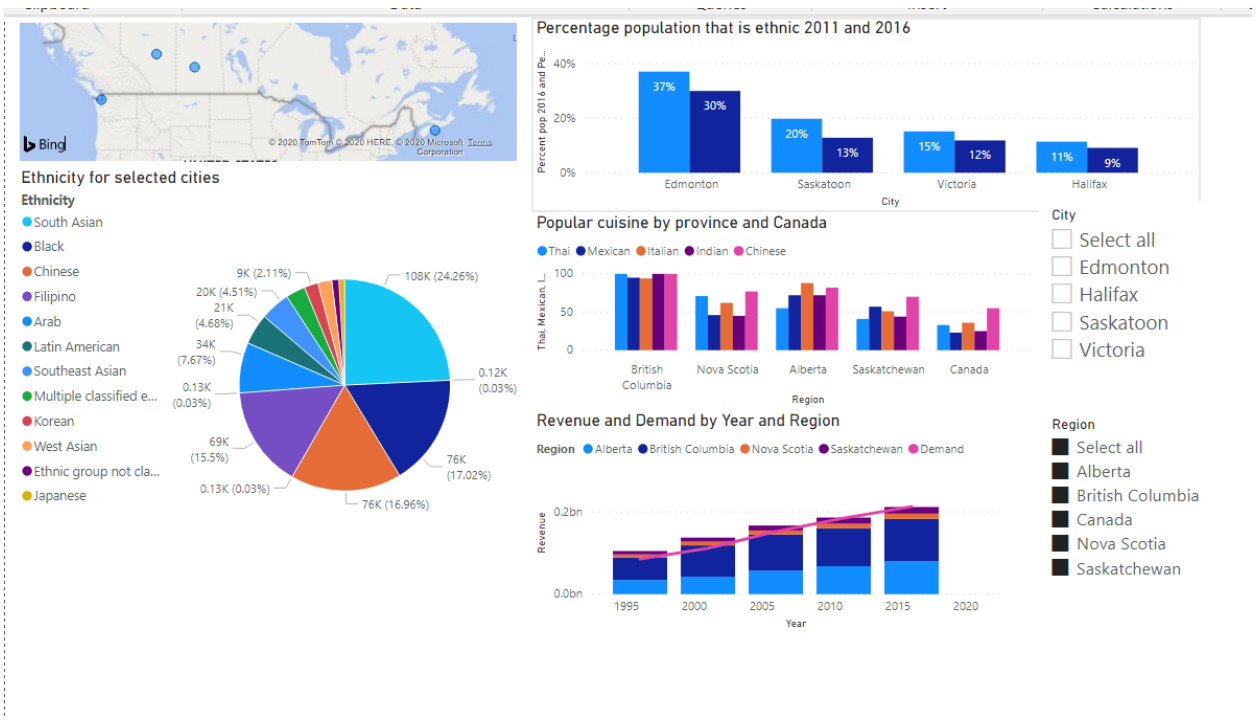
VIEW DATA BY PROVINCE: First click outside the box of the newly created stacked column chart. Click on the Slicer icon and select Province from the “Activity by province” table. The slicer allows the user to view the data separately for each province.

Note that this step-by-step tutorial does not cover the formatting of titles. It is suggested that students explore the formatting tool on the Visualization pane to learn more about formatting.

Solutions

Solution to Question 1

a) The solution to this section should be a working model of the following exhibit taken from the question:



The student's illustration may not be exactly the same as this illustration, depending on which city and region slicer options have been chosen, as well as the graphical organization of the data and formatting done.

i. This observation is based on the "Percent population that is ethnic 2011 and 2016" and "2016 Ethnicity for selected cities" visualizations using the "Data Slicer by City". Based on these visualizations, Saskatoon experienced the largest growth percentage (20 – 13)/13 = 54%. The major ethnicity in 2016 was South Asian (28%) and Filipino (23%). Next was Victoria with (15 – 12)/12 = 25% growth with a 2016 ethnicity majority of Chinese (26%) and South Asian (14%). Edmonton growth was (37 – 30)/30 = 23% with South Asian (26%) and Chinese (17%) as major ethnic groups in 2016. Halifax had the lowest growth with (11 – 9)/9 = 22% growth. Major ethnic groups in Halifax in 2016 were black (33%) and Arab (16%), followed closely by Chinese (15%) and South Asian (14.5%).

ii. This observation is based on the "Revenue in comparison to demand 1996-2016" and "Popular cuisine by province and Canada" visualizations using the "Data Slicer by Region". Review of the data:

- **British Columbia:** The demand for ethnic foods was oversupplied from when this data was available in 1996 into 2006. There was a period where demand exceeded supply from 2006 to 2015. However, the demand appears to be fully met in 2015/2016 with the demand curve levelling off to match the revenue.
- **Alberta:** There was an oversupply of ethnic deli choices between 1996 and 2016. This means that revenue over demand is from consumers who purchase generic food items from delis. It should be noted that the gap was at its widest in the early 2000s with 35% of revenue [($42.3 million – 27.5 million)/42.3 million] coming from these generic purchases. By 2016 this gap had narrowed to 6% [($79.6 – 75.0)/79.6].
- **Saskatchewan:** Ethnic deli availability has been fairly matched with the demand for ethnic foods between 1996 and 2016.
- **Nova Scotia**: In the late 1990s and early 2000s there were sufficient ethnic delis to address the demand for ethnic foods. However, between 2006 and 2016, there has been a sharp increase in demand which leaves a gap of almost $3.3 million ($15.86 million – $12.58 million) in 2016 between availability and demand.

Opportunity for growth:

There are two opportunities for growth that Gaspar could consider.

- First is the almost $3.3 million gap between 2016 demand and revenues in Nova Scotia. The popular cuisines in Nova Scotia are Thai and Italian.
- Second, the demand trend in Alberta is increasing at a faster rate than revenue from ethnic delis. The most popular cuisine in Alberta is Italian.

iii. Summary recommendation:

Based on the results of the visualizations, Gaspar's original strategy has been successful. However, it should be noted that Mil Alimentos has opportunity for growth. The data indicates that there is an additional demand in excess of $3.2 million in Nova Scotia that has not been met. More data should be resourced to determine the geographic regions of this demand.

Additionally, Gaspar should be observant of the demand growth in Alberta. Because the demand versus ethnic deli gap has been narrowing since 2006, it should be monitored in relation to immigration beyond 2016. If the demand continues to grow at a faster pace than ethnic deli revenues, Gaspar could consider starting a retail outlet in Alberta. Here, as well, more data would have to be resourced to determine the geographic regions of this demand.

Another factor to consider is the median age of each of the ethnic groups provided in the data. This data could be further assessed to determine which age

group is driving the demand for ethnic foods. This could also assist in retail placement and marketing.

iv. Accountants must have a healthy skepticism of the validity (veracity) of all data used in decision-making. When making decisions using data analytics, it is necessary to remind the decision maker of the risk involved in using various data sets. In this case, we can be reasonably assured that data sourced from Statistics Canada is valid, consisting of limited bias. On the other hand, Google Trends provides access to a variety of data sets. Users of these data sets must have enough knowledge of the data to ensure that it adequately represents a foundation on which a decision can be made. Gaspar should question the reliability of the data relating to popular cuisines across provinces. Questions relating to the geographical source of information within the province would help to identify pockets of demand that may be different from the overall data for the province. Additionally, using demand from social media sites should take into consideration the demographics of individuals that frequent these sites.

b) Monitoring and evaluating strategic objectives could be accomplished as follows:

Examine underlying strategies

- Monitor immigration trends to the city.
- Scan local news and social media for evidence of interest in a wider range of ethnic foods.
- Test the assumption that interest in new foods will translate into people preparing the foods themselves. (People of all cultures may love sushi, but how many of them would prepare it at home themselves?)

If results are significantly different than expected, then take corrective action by adjusting the product mix, target market, and/or marketing plan. If assumptions prove to be wrong, revisit the performance measures chosen to see if they are still relevant and realistic before examining actual performance.

Examine actual performance

- Monitor and evaluate actual sales results.
- Assess progress against targeted growth.

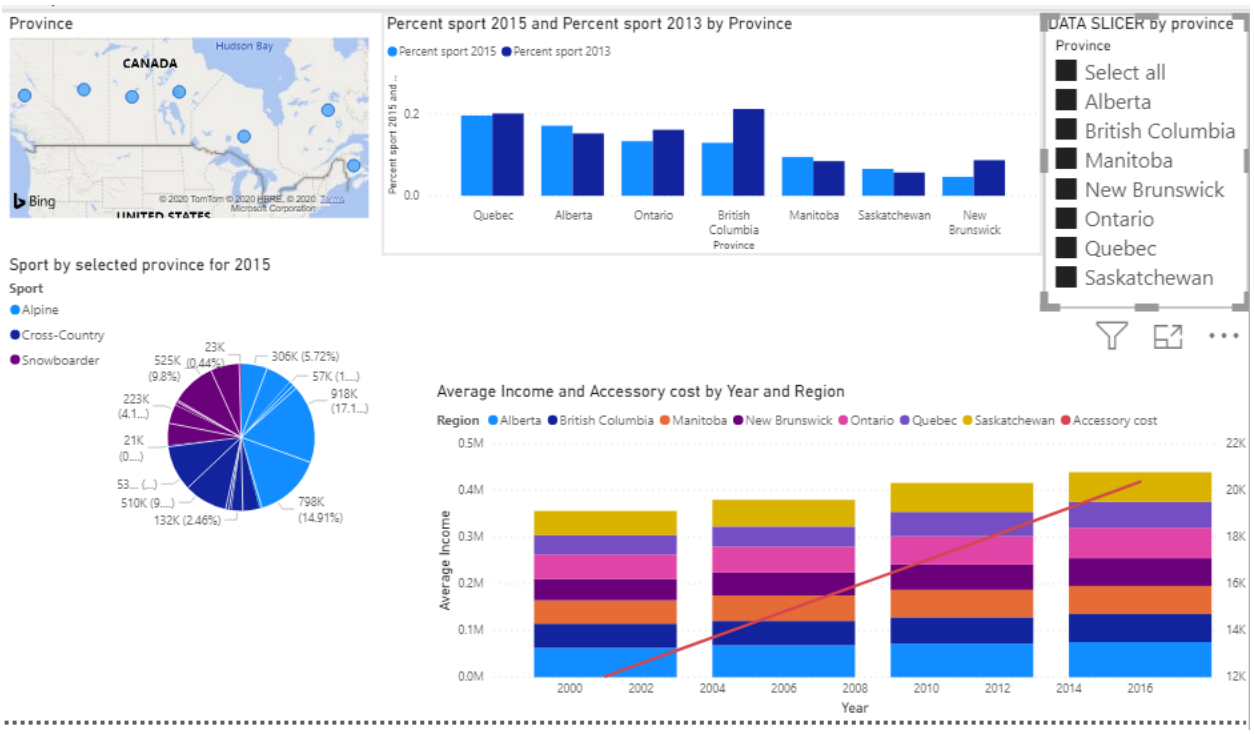
If results are significantly different than targeted, then take corrective action by adjusting activities and/or targets. This will require closer examination of where the differences are occurring. Perhaps more aggressive or targeted advertising is needed, or a creative means of getting the word out could make a difference. If assumptions proved to be correct but targets are being missed, revisit the targets to see if they are unrealistic (because they were overly optimistic to begin with).

If the environmental scan is consistent with previous research and results are on target, keep going (and keep monitoring).

Solution to Question 2

a)

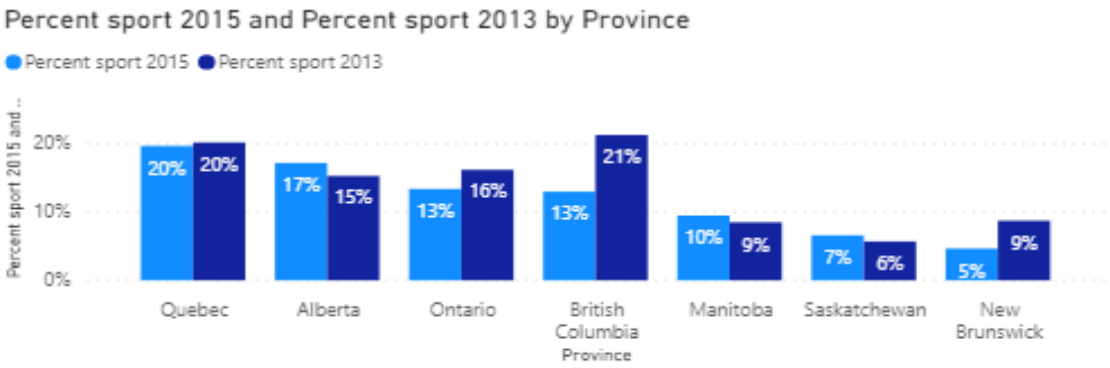
The following is a sample solution of the dashboard:



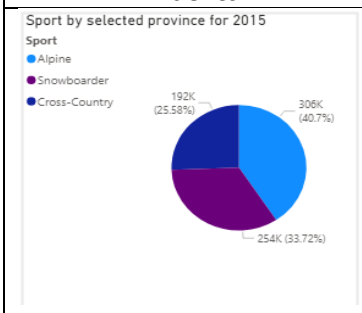
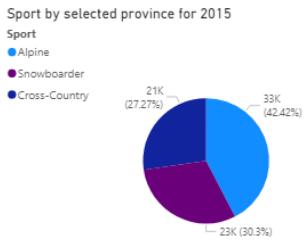
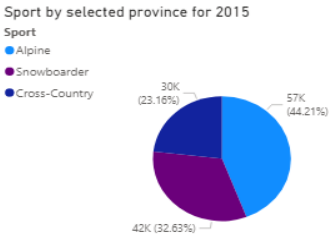
The solution should contain the visualizations given in the directions with a data slicer that allows the user to select the data by province. Marks should be awarded for the clarity of the dashboard, which should include appropriate headings and readability.

b)

i. The following visualization gives an overview of the growth of the ski and snowboard industry in selected provinces between 2013 and 2015.

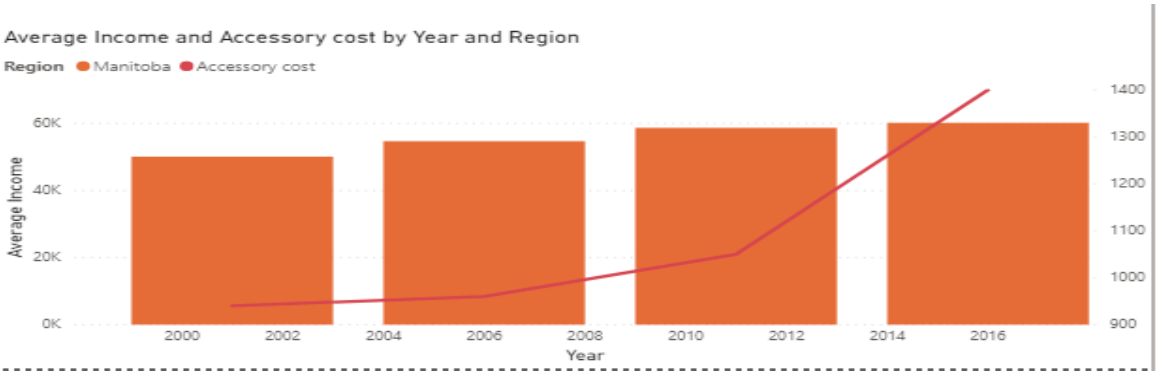


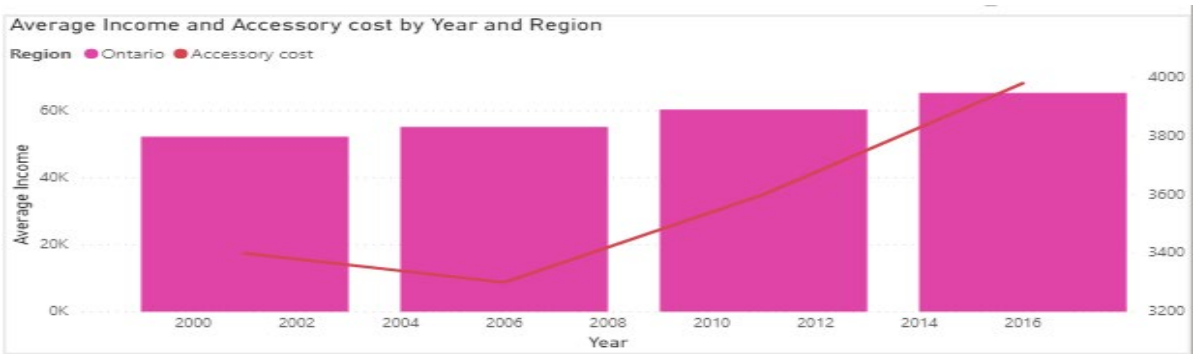
It is interesting to note that only Alberta, Manitoba, and Saskatchewan experienced growth during this period of time. A visualization of the percentage share of alpine skiing, cross-country skiing, and snowboarding in 2015 shows the following for each of these provinces:

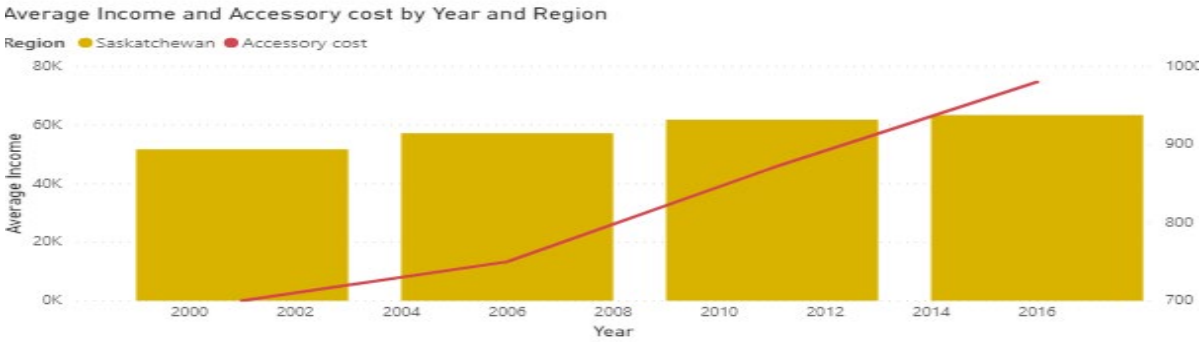
Alberta	Saskatchewan	Manitoba
		

Also to note is that the popularity of each sport is fairly consistent between all provinces with alpine skiing taking up the largest percentage, followed by snowboarding and cross-country skiing.

ii. The line and stacked column chart was used to determine the ski accessory spending habits of Canadian skiers. A province-by-province view of the average income of the skier/snowboarder versus accessory spending was taken. Accessory spending increasing at a faster rate than income was indicated an opportunity in Manitoba, Ontario, and Saskatchewan as shown below:

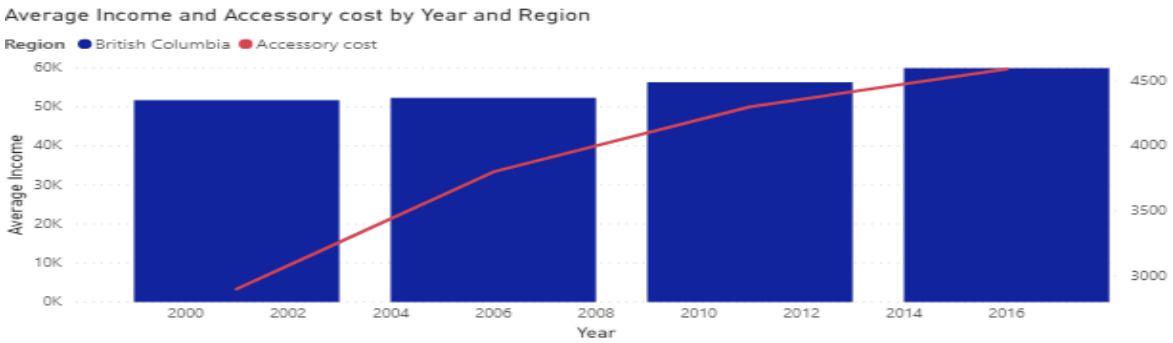






When making these observations, it should be noted that while each of these provinces shows positive growth in accessory spending, Ontario's growth represents a significant per-person amount of $3,980, whereas Manitoba's growth is $1,400 and Saskatchewan's is $980 in 2015. This should be taken into consideration when planning to expand.

Accessory spending following income growth or flatlining was considered a decreased opportunity, especially in British Columbia, where the industry wasn't showing growth, as follows:



c)

Potential opportunities to be explored at the strategy-planning retreat include:

i. Further analysis into the reason why the ski/snowboard industry decreased between 2013 and 2015 in all provinces, except for the prairie provinces: Further diagnostic analytics would help to determine the cause for this. This would help in making future predictions. Learning more about leading indicators such as age or weather would be helpful.

ii. Potential focus of efforts on marketing of both accessories and skis in Manitoba and Saskatchewan: Based on the statistics given, the market for ski/snowboard equipment in other provinces is saturated.

iii. Potential focus of efforts on marketing accessories in Manitoba, Ontario, and Saskatchewan: All three of these provinces indicate positive trends on accessory spending.

iv. Further analysis of which of the three sports is expanding at a faster rate: While alpine skiing has the majority of participants across all provinces, continued growth in snowboarding and cross-country skiing might indicate a new market diversification for EFI.

d)

Two additional data sets which could be integrated into this dashboard to provide assistance in future strategic planning include:

i. Change in median age of winter sport participants: This data is already included in the data set. Integrating this into the average age by sport and the spending by age category would be helpful in determining the marketing focus of both ski equipment and accessories.

ii. Data on weather conditions affecting ski/snowboard activity for all years: Currently, the dashboard would be classified as descriptive analytics. Adding weather-related effects would help turn this into a diagnostic dashboard to help determine why ski/snowboard activity declined in most provinces.