Enterprise sizes by NAICS in Canada Report

Importing and Data Processing

(We are importing our data after raw data processing in MS Excel.)

```
 advTech = importfile4("advtech.csv");
 advTech.totalSize = advTech.AgricultureForestryFishingAndHunting +
advTech.MiningQuarryingAndOilAndGasExtraction + advTech.Utilities +
advTech.Construction + advTech.Manufacturing + advTech.WholesaleTrade +
advTech.RetailTrade + advTech.TransportationAndWarehousing +
advTech.PostalServicesCouriersAndMessengersWarehousingAndStorage7 +
advTech.InformationAndCulturalIndustries +
advTech.FinanceAndInsuranceExcludingMonetaryAuthorities8;
 advTech.Properties.VariableNames{1} = 'Technology'
```

advTech = 7×17 table

	Technology	AgricultureForestryFishingAndHunting
1	Material handling, supply chain or logistics technologies	20.8000
2	Design or information control technologies	15.5000
3	Processing or fabrication technologies	14.8000
4	Clean technologies	13.9000
5	Security or advanced authentication systems	12.4000
6	Business intelligence technologies	16.1000
7	Other types of advanced technologies	4.4000

```
 emergingTech = importfile4("emertech.csv");
 emergingTech.totalSize = emergingTech.AgricultureForestryFishingAndHunting +
emergingTech.MiningQuarryingAndOilAndGasExtraction + emergingTech.Utilities +
emergingTech.Construction + emergingTech.Manufacturing +
emergingTech.WholesaleTrade + emergingTech.RetailTrade +
emergingTech.TransportationAndWarehousing +
emergingTech.PostalServicesCouriersAndMessengersWarehousingAndStorage7 +
emergingTech.InformationAndCulturalIndustries +
emergingTech.FinanceAndInsuranceExcludingMonetaryAuthorities8;
 emergingTech.Properties.VariableNames{1} = 'Technology'
```

emergingTech = 7×17 table

	Technology	AgricultureForestryFishingAndHunting
1	Nanotechnology	0
2	Biotechnology	5.4000
3	Geomatics or geospatial technologies	5.3000
4	Artificial intelligence (AI)	1.8000
5	Integrated Internet of Things (IoT) systems	13.8000
6	Blockchain technologies	0
7	Other types of emerging technologies	2.7000

```
contributionsByTech = importfile11("biggerTechContributions2.csv")
```

contributionsByTech = 3×2 table

	Techs	PercentageContribution
1	Advanced technology use	2
2	Emerging technology use	3
3	Traditional technologies	95

```
contributionsByInd = importfile8("biggerIndContributions3.csv")
```

contributionsByInd = 6×2 table

	Industries	PercentageContribution
1	Postal services, couriers and messengers, warehousing and storage	7
2	Finance and insurance excluding monetary authorities	8
3	Total selected services	5
4	All transportation	6
5	Total all surveyed industries	4
6	others	70

```
distribution = importfile12("distribution.csv");
distribution.IndustryCode = categorical(["CATEGORY 1";"CATEGORY 2"; "CATEGORY 3";"CATEGORY 4";"CATEGORY 5";"CATEGORY 6";"CATEGORY 7";"CATEGORY 8";"CATEGORY 9";"CATEGORY 10";"CATEGORY 11";"CATEGORY 12";"CATEGORY 13";"CATEGORY 14";"CATEGORY 15"])
```

distribution = 15×4 table

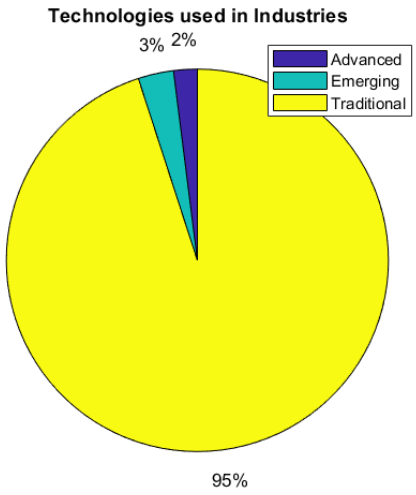
	Industries	AdvancedTechnologyUse	EmergingTechnologyUse
1	Agriculture, forestry, fishing and hunting	37.6000	22.3000
2	Mining, quarrying, and oil and gas extraction	39.2000	21.8000
3	Utilities	67.3000	36.7000
4	Construction	36.3000	19.9000
5	Manufacturing	52.8000	15.5000
6	Wholesale trade	52.9000	18.9000
7	Retail trade	28.7000	11
8	Transportation and warehousing	45.6000	16.1000
9	Postal services, couriers and messengers, warehousing and storage 7	55.4000	14.1000
10	Information and cultural industries	59.8000	35.2000
11	Finance and insurance excluding monetary authorities 8	54.8000	28.4000
12	Real estate and rental and leasing	37.7000	11.2000
13	Professional, scientific and technical services	56.1000	38.4000
14	Management of companies and enterprises	33	9.4000
15	Administrative and support, waste management and remediation services	36.4000	17.5000

Visualizations

Pie Chart of

the Technologies used in Industries

```
pie(contributionsByTech.PercentageContribution)
legend('Advanced','Emerging','Traditional')
title('Technologies used in Industries')
```

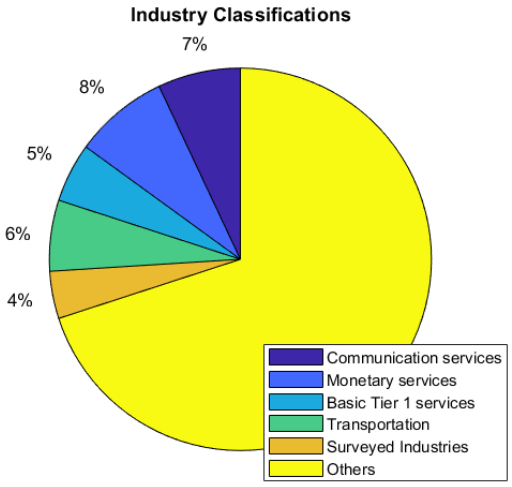


Contribution of *Advanced* and *Emerging* technologies in industries is still very less but *considerably visible*.

Pie Chart of

Industry Classifications

```
 pie(contributionsByInd.PercentageContribution)
 legend('Communication services','Monetary services','Basic Tier 1
services','Transportation','Surveyed Industries','Others','Location',"best")
 title('Industry Classifications')
```



These five sectors have a fair hold in the stream of multi sector enterprices with max being in the *finance* sector.

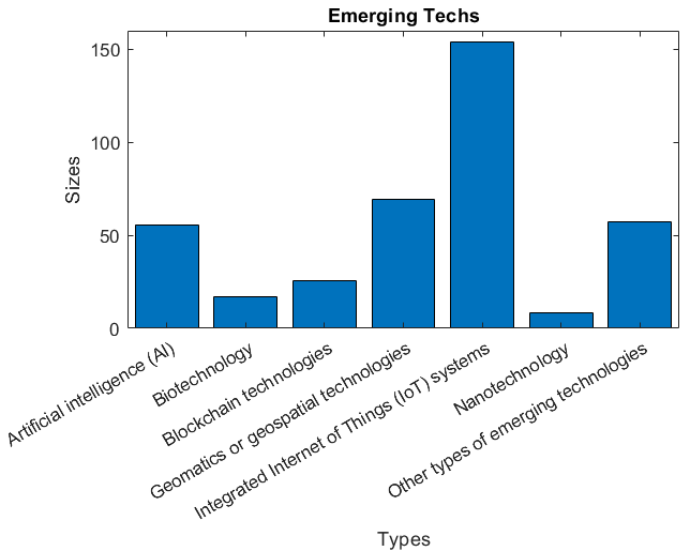
Bar Chart of

Emerging Technology types and their hold of influence in Application

or: Which is the maximum applied Emerging Technology?

This chart gives us an idea about what all are the Emerging Technologies and which technology is currently in maximum use or minimum use.

```
 bar(emergingTech.Technology,emergingTech.totalSize,'DisplayName','emergingTech.
totalSize')
 title('Emerging Techs')
 xlabel('Types')
 ylabel('Sizes')
```



We see that in the emerging technologies *IoT sytems* has maximum influence followed by *Geomantics* and *AI*.

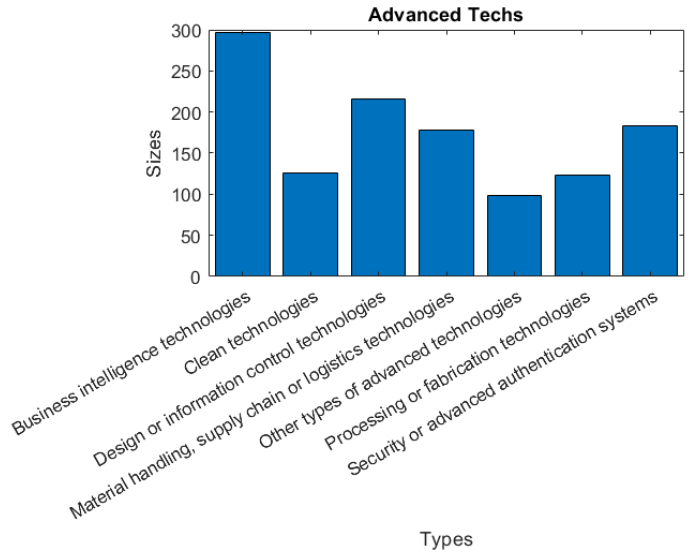
Bar Chart of

Advanced Technology types and their hold of influence in Application

or: Which is the maximum applied Advanced Technology?

This chart gives us an idea about what all technologies come under Advanced Technologies and which technology is currently in maximum use or minimum use.

```
bar(advTech.Technology,advTech.totalSize,'DisplayName','advTech.totalSize')
title('Advanced Techs')
xlabel('Types')
ylabel('Sizes')
```



We see in this chart that in the advanced technologies *Business Intelligence Tech* has maximum influence followed by *IT*.

Bar Chart of

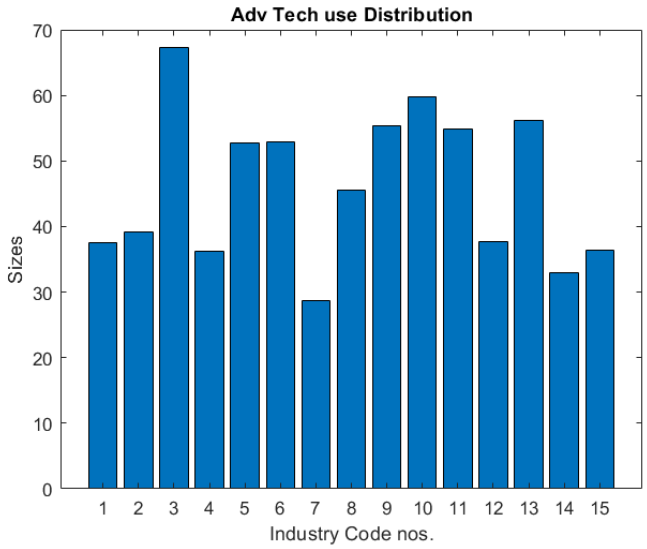
Advanced Tech use distribution in Industries

or: Which Industry is in lead in using the Advanced technologies?

This chart would give us an idea about the use of Advanced technologies overall in industries. (We had to plot by the industry codes as the names were too big! A reference is attached later for ease.)

```
bar(distribution.AdvancedTechnologyUse)
```

```
 %bar(distribution.IndustryCode,distribution.AdvancedTechnologyUse,'DisplayName'
,'distribution.AdvancedTechnologyUse')
 title('Adv Tech use Distribution')
 xlabel('Industry Code nos.')
 ylabel('Sizes')
```



Hence we see that category 3 has the highest use i.e., the *Utilities* sector. With categories 10 and 13 having fairly high shares following utilities.

For reference here is the list:

```
indCodeTable = table(distribution.Industries)
```

indCodeTable = 15×1 table

	Var1
1	Agriculture, forestry, fishing and hunting
2	Mining, quarrying, and oil and gas extraction
3	Utilities
4	Construction
5	Manufacturing
6	Wholesale trade
7	Retail trade
8	Transportation and warehousing
9	Postal services, couriers and messengers, warehousing and storage 7

	Var1
10	Information and cultural industries
11	Finance and insurance excluding monetary authorities 8
12	Real estate and rental and leasing
13	Professional, scientific and technical services
14	Management of companies and enterprises
15	Administrative and support, waste management and remediation services

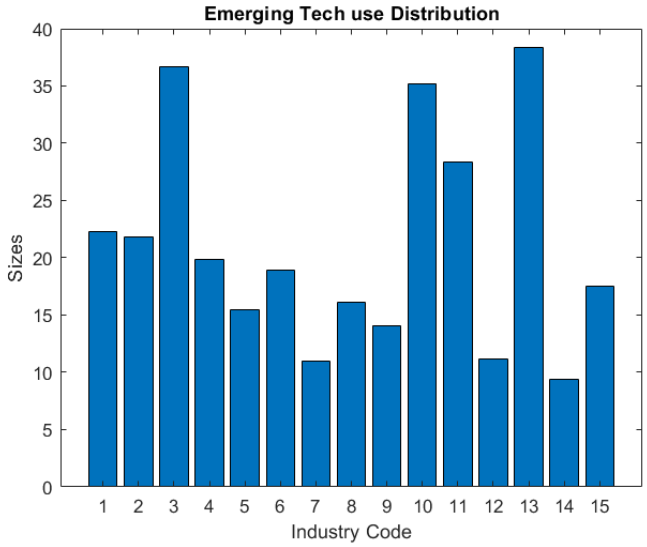
Bar Chart of

Emerging Tech use distribution in Industries

or: Which Industry is in lead of using the Emerging Technologies?

Similarly, this chart would give us an idea about which industries use how much of the available emerging technologies. (Please refer the Industry codes table for ease.)

```
bar(distribution.EmergingTechnologyUse)
title('Emerging Tech use Distribution')
xlabel('Industry Code')
ylabel('Sizes')
```



Hence here we see that Category 13 i.e., the Professional, Scientific and the Technical services lead in using the Emerging Technologies.

For reference here is the list:

```
indCodeTable = table(distribution.Industries)
```

indCodeTable = 15×1 table

	Var1
1	Agriculture, forestry, fishing and hunting
2	Mining, quarrying, and oil and gas extraction
3	Utilities
4	Construction
5	Manufacturing
6	Wholesale trade
7	Retail trade
8	Transportation and warehousing
9	Postal services, couriers and messengers, warehousing and storage 7
10	Information and cultural industries
11	Finance and insurance excluding monetary authorities 8
12	Real estate and rental and leasing
13	Professional, scientific and technical services
14	Management of companies and enterprises
15	Administrative and support, waste management and remediation services

Inferences and Verifications

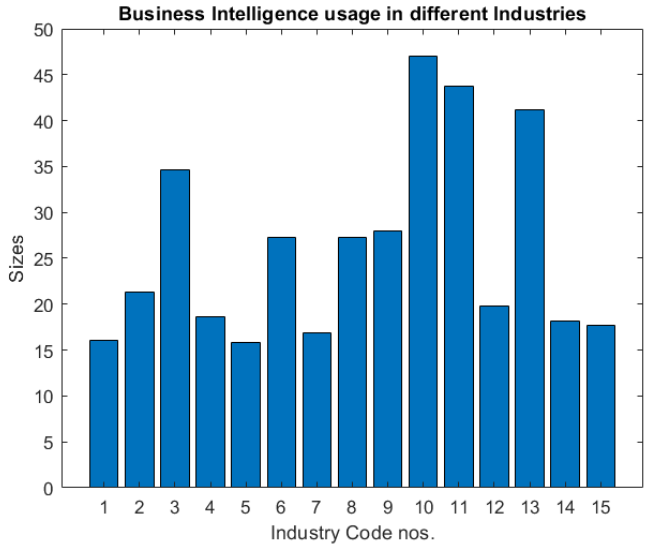
Now that we have answers to questions like:

What are the bigger Industry sectors? *Finance > Communication > Transportation > Tier 1 services > Industries.* **What are the contribution pecentages of Advanced and Emerging Tech in overall Tech use?** *2% and 3% respectively.* **Which particular Advanced or Emerging Tech is used the most?** *Business Intelligence and IoT Systems respectively.* **Which Industry uses the most of Advanced or Emerging Tech?** *Utilities sector and Professional, Scientific and the Technical services sector respectively.*

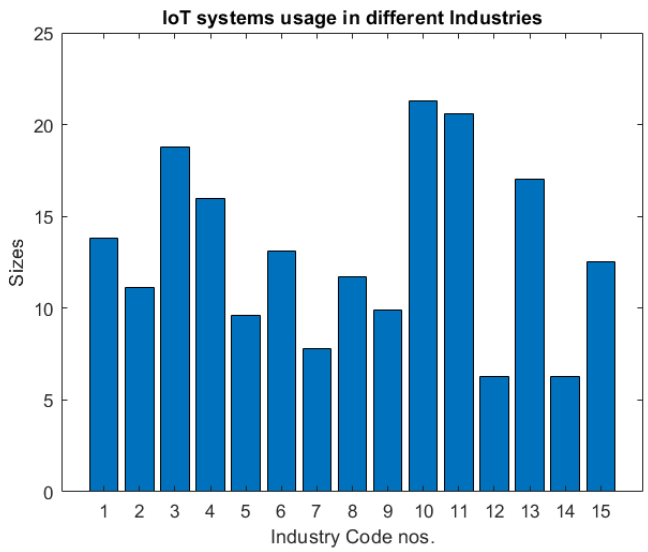
We can further focus on Utilities sector , the Professional, Scientific and the Technical services sector, the Business Intelligence Tech and the IoT Systems Tech.

Let's draw out the information of Business Intelligence Systems and IoT systems.

```
 businessIntelligence = advTech(advTech.Technology == 'Business intelligence
technologies',:);
 businessIntelligence = table2cell(businessIntelligence);
 businessIntelligence = transpose(businessIntelligence);
 bar(cell2mat(businessIntelligence(2:16,1)))
 xlabel('Industry Code nos.')
 ylabel('Sizes')
 title('Business Intelligence usage in different Industries')
```




```
 IoTsys = emergingTech(emergingTech.Technology == 'Integrated Internet of Things
(IoT) systems',:);
 IoTsys = table2cell(IoTsys);
 IoTsys = transpose(IoTsys);
 bar(cell2mat(IoTsys(2:16,1)))
 xlabel('Industry Code nos.')
 ylabel('Sizes')
 title('IoT systems usage in different Industries')
```

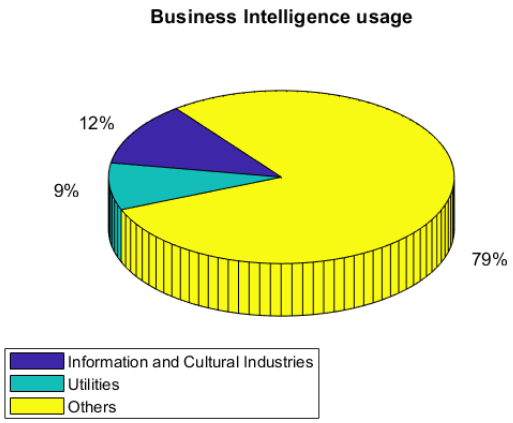


From the above graphs we can say that Business Intelligence and IoT systems Technology both are used the most in *Information and Cultural Industries* (CATEGORY 10).

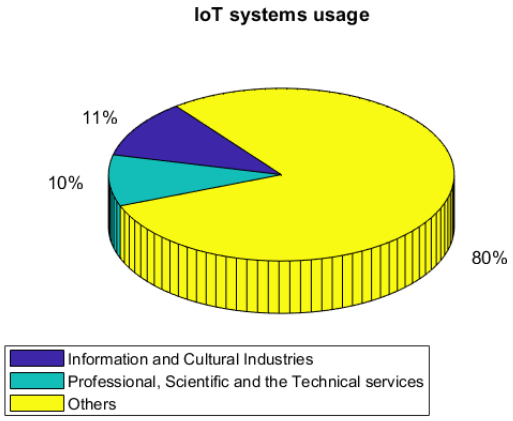
Also we can note that *Utilities*, i.e., CATEGORY 3 has a fair share of usage with *size 34.6 with the highest being size 47* (in Information and Cultural Industries obviously) in the Advanced Tech usage of Business Intelligence. Now, in IoT systems usage also we can note that *Professional, Scientific and the Technical services* sector CATEGORY 13 has a fairly high usage *size i.e., 17 with the highest in it being size 21.3*. So here our past inferences seem to match the evidences!

Let's represent these information in pie chart now:

```
 ab = (cell2mat(businessIntelligence(2:16,1)));
 c = ab(10,1); d = ab(3,1); e =
sum([transpose(ab(1:2)),transpose(ab(4:9)),transpose(ab(11:15))]);
 pie3([c,d,e])
 legend('Information and Cultural
Industries','Utilities','Others','Location',"southwest")
 title('Business Intelligence usage')
```




```
 fg = (cell2mat(IoTsys(2:16,1)));
 h = fg(10,1); i = fg(3,1); j =
sum([transpose(fg(1:2)),transpose(fg(4:9)),transpose(fg(11:15))]);
 pie3([h,i,j])
 legend('Information and Cultural Industries','Professional, Scientific and the
Technical services','Others','Location',"southwest")
 title('IoT systems usage')
```



And here again we can see our past inferences match the evidences from the plots.

Conclusions

What are the bigger Industry sectors? *Finance > Communication > Transportation > Tier 1 services > Industries.* **What are the contribution pecentages of Advanced and Emerging Tech in overall Tech use?** *2% and 3% respectively.* **Which particular Advanced or Emerging Tech is used the most?** *Business Intelligence and IoT Systems respectively.* **Which Industry uses the most of Advanced or Emerging Tech?** *Utilities sector and Professional, Scientific and the Technical services sector respectively.*

Yes indeed they were correct. *And additionally we conclude that,*

Business Intelligence (Advanced Tech) and *IoT systems* (Emerging Tech) both are used the most in ***Information and Cultural Industries***, with a respective size of 47 and 21.3. Which is quite a logical outcome! And Industries like *Utilities* and *Professional, Scientific and the Technical services* also have a fair contribution to the usage of these two Techs being the most to use the Advanced and Emerging Techs respectively.

Hence it is seen that the newest of the technologies have started to come into use visibly in the surveyed industries of Canada but have nowhere yet replaced the traditional methods. There is still a lot of area to be covered and conquered by the newest of the Techs.

Thank You!