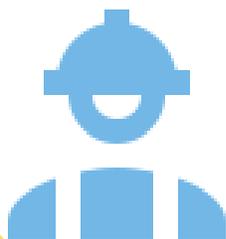


PROFILING THE OCCUPATIONAL CLUSTERS OF YORK REGION

Examining York Region's Labour Market Through A Different Lens

JULY 2020



Executive Summary

This report provides a different lens through which to view York Region's labour market. We propose 14 occupational clusters, which group occupations by broad industry functions as well as by skill level, as follows:



Rulemakers:

The higher echelons of organizations (senior executives and specialized mid-level managers) and the related professional occupations (lawyers, financial analysts, accountants, HR professionals, management consultants, marketing and PR professionals)



Sustainers:

Professionals in health (physicians, nurses, pharmacists, therapy professionals) and education (professors, college instructors, high school and elementary school teachers), as well as social and community service professionals (psychologists, social workers, counsellors)



Calculators:

Professional STEM occupations such as scientists, engineers, architects, urban planners and mathematicians, as well as IT professionals (information systems analysts, computer programmers, web designers) and policy and program researchers



Artists:

Librarians, archivists, editors, journalists, writers, producers, directors, actors, conductors, musicians, dancers, singer, painters, sculptors



Administrators:

Mid-level supporting roles to Rulemakers, including middle management in wholesale and retail trade, customer services, skilled trades, production and transportation, as well as administrative occupations and specialist salespersons in technical sales, real estate, insurance and financial services



Supporters:

Mid-level supporting roles to Sustainers, including medical technologists and technicians and paraprofessionals in legal, social, community and education services (paralegals, social and community service workers, and early childhood educators)



Technologists:

Mid-level supporting roles in STEM, including science and engineering technologists and technicians, transportation officers (airline pilots, air traffic controllers, marine deck officers), and computer network and user support technicians



Makers:

Skilled trades contractors, supervisors and tradespersons; supervisors and technical occupations in primary, manufacturing and utilities industries



Artisans:

Mid-level supporting roles to Artists, including library and museum technicians, photographers, camera operators, recording technicians, announcers, graphic artists, illustrators, interior decorators, fashion designers, artisans, coaches, athletes, and recreation and fitness instructors



Protectors:

Front-line public protection services (police, firefighters, non-commissioned military staff) and protection support occupations (sheriffs, bailiffs and correctional service officers)



Labourers:

Entry-level, lower skilled or lower-paid manual labour (heavy equipment operators, transport truck drivers, installers, repairers, machine operators and assemblers, and labourers in primary sector, construction and manufacturing)



Clericals:

Entry-level, lower skilled or lower-paid office labour (general office workers and clerks, receptionists, payroll administrators, survey interviewers)



Servers:

Entry-level, lower skilled or lower paid service occupations (personal support workers, food service supervisors, cooks, food and beverage servers, cashiers, cleaners, food counter attendants, shelf stockers)



Sales:

Retail sales supervisors and salespersons

The largest occupational cluster in York Region, both in terms of what jobs residents are employed in as well as what jobs are present in York Region, is that of Administrators. York Region has the highest proportion of its jobs in this category and it is virtually tied with Halton Region for having the highest proportion of residents working in this category.

The clusters of Rulemakers, Calculators, Administrators and Clericals represent the broad range of office workers, encompassing such functions as managers, professionals, office supervisors, administrators, specialized salespersons and clerical staff, and York Region is typically among the top three urban areas in Ontario for its share of workers and jobs in these occupations, with a higher concentration of these jobs in private business sectors such as Wholesale Trade; Finance and Insurance; Real Estate and Rental and Leasing; and Professional, Scientific and Technical Services.

Among commuters, while slightly over half of York Region residents (53%) travel each day to jobs located in York Region, larger proportions of Rulemakers (63%), Calculators (68%) and Technologists (58%) have their jobs located outside of York Region. At the same time, jobs in several occupational clusters are more often filled by residents coming from outside York Region, such as Makers (60%), Blue-collar workers (60%) and Technologists (59%).

The highest average employment income among York Region residents are earned by Rulemakers, Protectors and Calculators.





While it may be premature to predict the overall labour market impact of the pandemic, the lockdown and the eventual recovery, the potential for more work to be done from home could have significant consequences for York Region.



There are distinct demographic divisions among these occupational clusters. In terms of gender, where the total workforce split is 52% males and 48% females, Makers consist of 95% males, Clericals are 82% females, Protectors are 82% males, and Blue-collars, Technologists and Calculators are each comprised of over 70% males. In terms of immigration status (overall: 52% immigrants and 48% Canadian-born), Protectors consist of 78% who are Canadian-born and 22% who are immigrants, while the reverse is found among Calculators, where 70% are immigrants and 30% are Canadian-born. In terms of visible minorities (who make up 47% of the workforce), 22% of Protectors are members of a visible minority, whereas 60% of Calculators are members of a visible minority.

While it may be premature to predict the overall labour market impact of the pandemic, the lockdown and the eventual recovery, the potential for more work to be done from home could have significant consequences for York Region. Given that York Region is home to a large proportion of workers among Rulemakers, Calculators, Administrators and Clericals, given the greater potential for these functions to be performed from a home base and given the large numbers of these workers who daily commute outside York Region for employment (primarily in Toronto), this could result in an increase in demand for local services which would cater to a larger number of home-based workers.

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Introduction

Towns and cities are often known by the local economies that define them. But from a labour market perspective, it is striking what little difference usually exists in the proportion of residents who work in the various occupations and industries which make up our local economies.

There are a few notable exceptions. In Ottawa, almost a quarter of its residents work in Public Administration, close to four times the provincial average. The bank and corporate towers of Toronto result in around 12% of that city's residents working in Finance and Insurance, around double the Ontario average. The attractions of Niagara Falls and the nearby vineyards stimulate a large Accommodation and Food Services industry, employing around 13% of local residents, also around double the provincial average. But in most cases, the percentage of residents who work in a particular occupational or industry category differs only by a few percentage points from one area to the next.

Part of the problem has to do with the very broad groupings which are used to classify industries or occupations. For example, workers in the broad occupational category of Business, Finance and Administration Occupations include professionals such as investment analysts and business management consultants, together with receptionists, couriers, and shippers and receivers. Similarly, the Health Care industry would include surgeons and nurses, as well as personal support workers and cleaners.



These categories end up lumping together workers with very different levels of educational attainment, skills and employment income. Yet if one drills down to a detailed level, there are hundreds of sub-categories, for both occupations and for industries, and it becomes hard to see the big picture.

Occupational Clusters

The Workforce Planning Board of York Region proposes a different approach for profiling a local labour market, one that can more easily reveal a narrative that better reflects the occupations of residents and the jobs that are present in a local area. We have developed 14 occupational clusters, each of which categorizes workers both by broad industry function as well as by skill level.^[1] We begin with three skill levels:

- Occupations which typically require a university degree
- Occupations which typically require a college diploma or a trades certificate
- Occupations which typically require a high school diploma or no certificate^[2]

Then, for each skill level, we propose the following clusters:

<p>USUALLY REQUIRES A UNIVERSITY DEGREE</p> 	<p>USUALLY REQUIRES A COLLEGE DIPLOMA OR A TRADES CERTIFICATE</p> 	<p>USUALLY REQUIRES A HIGH SCHOOL DIPLOMA OR NO CERTIFICATE</p> 
<p>Rulemakers Sustainers Calculators Artists</p>	<p>Administrators Supporters Technologists Artisans Protectors Makers</p>	<p>Labourers Clericals Servers Sales</p>



[1] These occupational clusters are a variation of occupational categories used in two previous reports issued by the Toronto Workforce Innovation Group: Tom Zizys, *An economy out of shape: Changing the hourglass* (2010); Tom Zizys, *Sifting through the sand: Unpacking the hourglass* (2011).

[2] These categories correspond to the skill levels used by the National Occupational Classification. The NOC code assigns to each occupation both a skill type (the occupational category) and a skill level. The first digit of the NOC code identifies the skill type (for example, the first digit “9” represents Manufacturing Occupations). The second digit identifies the skill level of the occupation by way of the following designations:

- “0” or “1” = Usually requires a university education;
- “2” or “3” = Usually requires a college education or apprenticeship training;
- “4” or “5” = Usually requires secondary school and/or occupation-specific training;
- “6” or “7” = On-the-job training is usually provided.

These occupational clusters^[3] can be described as follows:^[4]



Rulemakers:

The higher echelons of organizations (senior executives and specialized mid-level managers) and the related professional occupations (lawyers, financial analysts, accountants, HR professionals, management consultants, marketing and PR professionals)



Sustainers:

Professionals in health (physicians, nurses, pharmacists, therapy professionals) and education (professors, college instructors, high school and elementary school teachers), as well as social and community service professionals (psychologists, social workers, counsellors)



Calculators:

Professional STEM occupations such as scientists, engineers, architects, urban planners and mathematicians, as well as IT professionals (information systems analysts, computer programmers, web designers) and policy and program researchers



Artists:

Librarians, archivists, editors, journalists, writers, producers, directors, actors, conductors, musicians, dancers, singer, painters, sculptors



Administrators:

Mid-level supporting roles to Rulemakers, including middle management in wholesale and retail trade, customer services, skilled trades, production and transportation, as well as administrative occupations and specialist salespersons in technical sales, real estate, insurance and financial services



Supporters:

Mid-level supporting roles to Sustainers, including medical technologists and technicians and paraprofessionals in legal, social, community and education services (paralegals, social and community service workers, and early childhood educators)



Technologists:

Mid-level supporting roles in STEM, including science and engineering technologists and technicians, transportation officers (airline pilots, air traffic controllers, marine deck officers), and computer network and user support technicians



Makers:

Skilled trades contractors, supervisors and tradespersons; supervisors and technical occupations in primary, manufacturing and utilities industries



Artisans:

Mid-level supporting roles to Artists, including library and museum technicians, photographers, camera operators, recording technicians, announcers, graphic artists, illustrators, interior decorators, fashion designers, artisans, coaches, athletes, and recreation and fitness instructors



Protectors:

Front-line public protection services (police, firefighters, non-commissioned military staff) and protection support occupations (sheriffs, bailiffs and correctional service officers)



Labourers:^[5]

Entry-level, lower skilled or lower-paid manual labour (heavy equipment operators, transport truck drivers, installers, repairers, machine operators and assemblers, and labourers in primary sector, construction and manufacturing)



Clericals:

Entry-level, lower skilled or lower-paid office labour (general office workers and clerks, receptionists, payroll administrators, survey interviewers)



Servers:^[6]

Entry-level, lower skilled or lower paid service occupations (personal support workers, food service supervisors, cooks, food and beverage servers, cashiers, cleaners, food counter attendants, shelf stockers)



Sales:

Retail sales supervisors and salespersons



[3]Appendix A lists the 4-digit NOC occupations that make up each cluster.

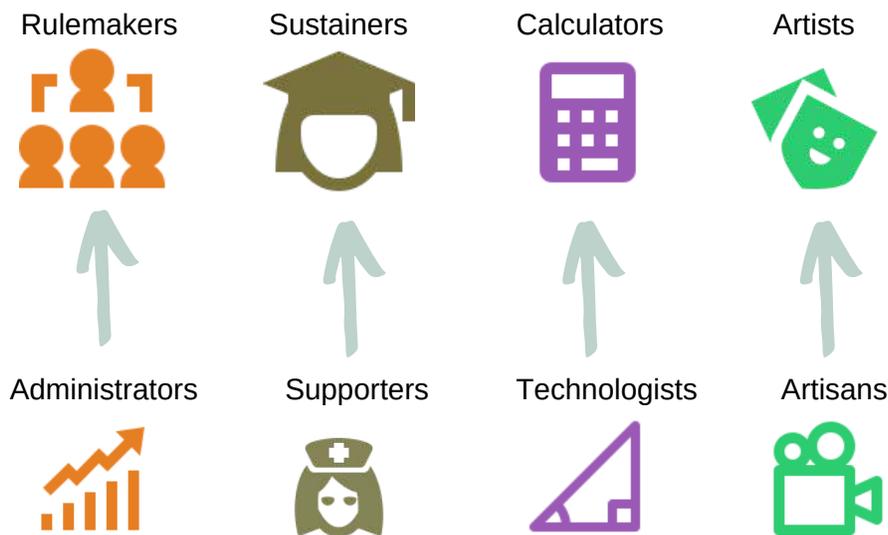
[4] With such broad categories, there will inevitably be a few occupations which do not quite fit the cluster to which they are assigned. In our view, for the sake of simplicity and ease of calculation, it is better to forgive the odd misplacement rather than seek perfect classifications.

[5] A number of these jobs are hardly low-skilled, for they require training and/or the operation of machinery. However, this list includes such jobs because in the National Occupational Classification, these jobs are listed as ones which typically would require a high school diploma at most.

[6] As was with case with Labourers, a number of these occupations also require skills, however, for this category, certain jobs have been included because they are typically characterized by low pay.

This analysis relies upon data derived from the 2016 Census. While the precise numbers being relied upon are a few years old, the proportions which define different categories are not something which change quickly over the course of a few years. It is these proportions which interest us the most in presenting this information.

Using these clusters, this paper describes the labour force in York Region, illustrating the size of each cluster and comparing it to the Ontario average, highlighting demographic features of each cluster, and analyzing the commuting patterns by cluster, including how this may be affected in a post-pandemic world. We feel this alternative lens of occupational clusters provides some interesting insights into the labour force which makes up York Region.



Employed residents by occupational clusters

Table 1: Employed residents by occupational clusters, 2016

Occupational Cluster	York Region Number	York Region (%)	Toronto (%)	Rest of Ontario (%)
Rulemakers	76,595	13.5	14.4%	9.0%
Sustainers	44,135	7.8%	8.2%	8.2%
Calculators	48,720	8.6%	8.0%	5.7%
Artists	5,070	0.9%	2.4%	0.8%
Administrators	104,885	18.6%	14.5%	15.7%
Supporters	20,720	3.7%	3.6%	4.1%
Technologists	16,950	3.0%	2.4%	2.9%
Artisans	12,340	2.2%	3.1%	1.7%
Protectors	3,455	0.6%	0.3%	1.2%
Makers	36,450	6.4%	4.9%	8.7%
Labourers	55,190	9.8%	10.5%	14.5%
Clericals	27,590	4.9%	3.9%	4.1%
Servers	88,430	15.6%	20.2%	19.2%
Sales	24,770	4.4%	3.7%	4.1%
TOTAL	565,300	100.0%	100.0%	100.0%

In the case of York Region residents, the following clusters stand out:

- **Clusters having a higher proportion of employed residents**
 - Rulemakers
 - Administrators
 - Calculators
 - Clericals
- **Clusters having a lower proportion of employed residents**
 - Artists
 - Labourers
 - Servers

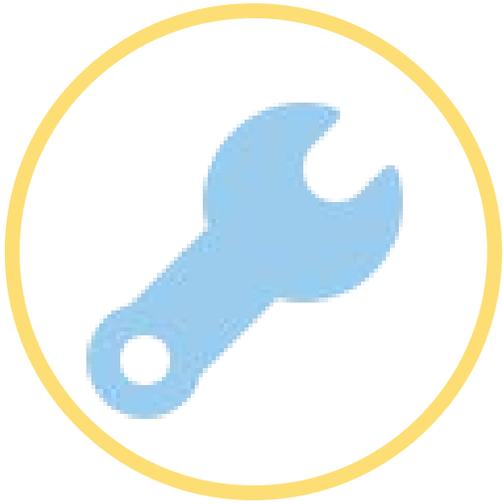


Table 1 provides the employment numbers for York Region residents, by occupational clusters, based on the 2016 Census. It also calculates the percentage distribution of employed York Region residents by these clusters and offers some comparisons. In most instances, local data is typically compared to provincial data. However, in the case of Ontario, there really are two rather distinct labour markets, one which is found in and around Toronto and the other being the rest of the province. To highlight these distinct labour markets, this paper uses two comparison points, City of Toronto data and Ontario minus the Toronto data – the latter will be called Rest of Ontario.

The colour-coding of cells in the table highlights those cells where the figure is higher (yellow highlight) or lower (turquoise highlight) for that category. It is apparent just from the distribution of colour-coded cells, that these three geographic areas each has their own distinctive profile of occupational clusters.

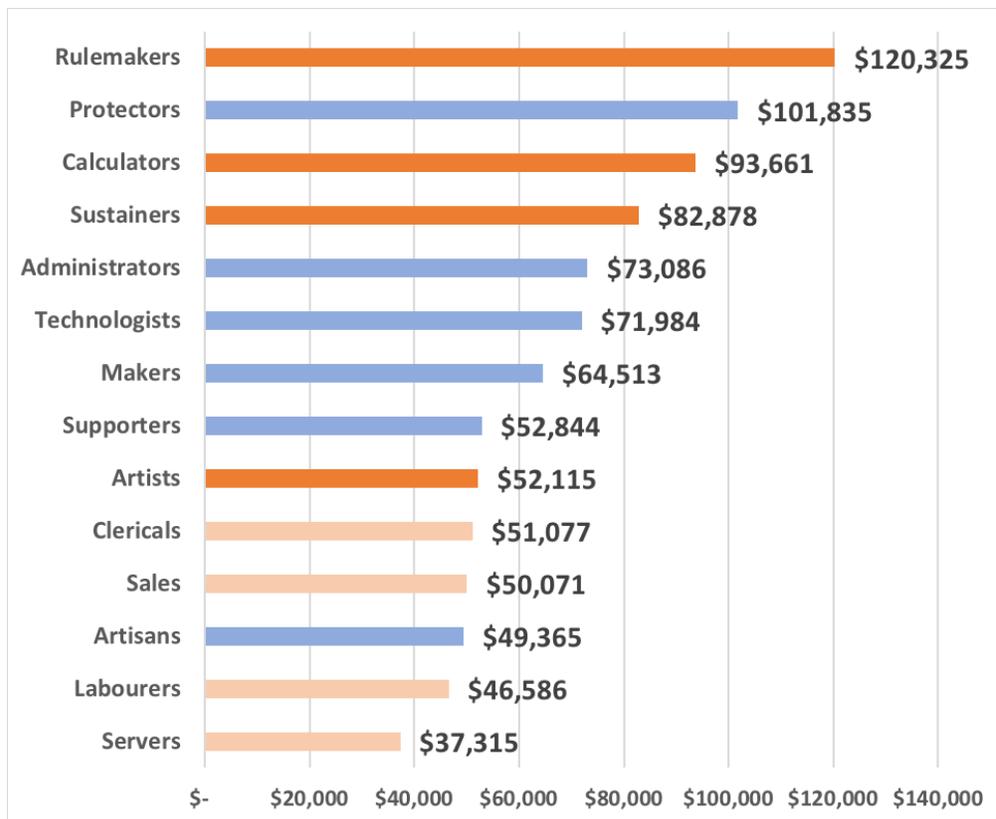


Toronto has both a higher proportion of Rulemakers as well as a higher proportion of Servers, highlighting an occupational and employment income divide in that city. While these are two smaller clusters, Toronto has a noticeably higher proportion of its residents employed in both the Artist and Artisan clusters, compared to either York Region or the Rest of Ontario. The Rest of Ontario has particularly higher proportions of its residents employed as Makers or Labourers, as well as Servers.

Employment income by clusters

Chart 1 presents the average annual employment income for each occupational cluster, for York Region residents employed full-time, full-year. The employment income comparison is limited to employees working full-time and for the full year, so that one can compare similar sets of workers.

Chart 1: Average annual employment income of York Region residents working full-time, full-year, by occupational clusters, 2015



To a large extent, employment income rewards the educational attainment requirements of the occupations in each cluster, with a few exceptions. Occupations usually requiring a university degree are colour-coded orange, those usually requiring a college diploma or trades certificate are coloured blue, and those usually requiring a high school diploma or no certificate are coloured pink.

The pattern reveals the hierarchy based on educational attainment, with two exceptions: Protectors, those occupations primarily representing police officers and firefighters, have incomes in the range of those occupations requiring a university degree, even their occupations are ranked at a college level; and Artists and Artisans, both of which rank below their designated level of education: Artists, whose occupations usually require a university degree, have incomes falling in the range for college or trades-related fields, and Artisans, whose jobs usually require a college diploma or trades certificate, have incomes in the middle of the pack of occupations usually requiring a high school diploma or less.

These rankings by employment income are broadly reflected in the figures for Toronto and the Rest of Ontario, although there are some variations by geography (Table 2).

Table 2: Average annual employment income of all residents working full-time, full-year, by occupational clusters, York Region, Toronto and the Rest of Ontario, 2015

	York Region (%)	Toronto (%)	Rest of Ontario (%)
ALL OCCUPATIONS	\$ 75,219	\$ 78,644	\$ 66,211
Rulemakers	\$ 120,325	\$ 152,315	\$ 110,166
Sustainers	\$ 82,878	\$ 86,166	\$ 80,949
Calculators	\$ 93,661	\$ 87,624	\$ 90,347
Artists	\$ 52,115	\$ 58,833	\$ 53,381
Administrators	\$ 73,086	\$ 72,116	\$ 64,962
Supporters	\$ 52,844	\$ 52,081	\$ 52,194
Technologists	\$ 71,984	\$ 66,203	\$ 71,211
Artisans	\$ 49,365	\$ 52,489	\$ 46,094
Protectors	\$ 101,835	\$ 92,546	\$ 92,060
Makers	\$ 64,513	\$ 57,708	\$ 65,386
Labourers	\$ 46,586	\$ 42,905	\$ 48,316
Clericals	\$ 51,077	\$ 52,077	\$ 47,878
Servers	\$ 37,315	\$ 36,393	\$ 36,069
Sales	\$ 50,071	\$ 45,443	\$ 44,469

Toronto residents working in the Rulemaker cluster have a much higher employment income than that found among residents of either York Region or the Rest of Ontario, in the range of \$150,000, compared to \$110,000 to \$120,000 elsewhere. But Toronto residents are not always the better paid, by different clusters. York Region residents employed as Calculators, Administrators, Supporters, Technologists, Protectors, Servers and Sales workers, all make higher incomes (sometimes only marginally so) than residents living in Toronto or in the Rest of Ontario. In the Rest of Ontario, workers in the Maker and Labourer clusters are the best paid in their category.

Local jobs by occupational clusters

Knowing which occupations York Region residents may be employed in does not mean that all these jobs are located in York Region. Table 3 shows the data for the actual jobs located in York Region by occupational clusters and provides the percentage distribution, comparing the figures to those for Toronto and the Rest of Ontario.

One drawback for jobs based on geography is that it does not include jobs which have no fixed location, where workers constantly move from one job location to another. Overall, approximately 11% of jobs in Ontario are classified as having no fixed workplace. Thus, this data does not include all jobs, under-counting the total by 11%. Moreover, certain industries and occupations have a much higher rate of employment in no fixed workplace. For example, around half of all employees in the Construction industry work at no fixed workplace, as do a little over one-third of workers in the Truck Transportation sector. As a result, specific industries are particularly under-counted when jobs in a specific locality are highlighted.

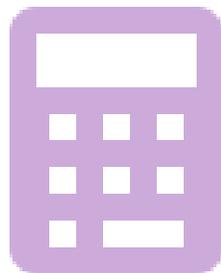
Table 3: Local jobs by occupational clusters, 2016

Occupational Cluster	York Region Number	York Region (%)	Toronto (%)	Rest of Ontario (%)
Rulemakers	51,520	10.8%	17.6%	8.7%
Sustainers	30,705	6.5%	8.5%	8.5%
Calculators	33,485	7.0%	9.3%	5.7%
Artists	3,760	0.8%	2.0%	0.8%
Administrators	87,605	18.4%	15.9%	16.2%
Supporters	16,915	3.6%	3.9%	4.3%
Technologists	15,200	3.2%	2.5%	2.9%
Artisans	10,175	2.1%	2.7%	1.7%
Protectors	3,255	0.7%	0.8%	1.2%
Makers	28,645	6.0%	3.3%	6.9%
Labourers	62,665	13.2%	7.3%	13.8%
Clericals	24,265	5.1%	4.6%	4.4%
Servers	83,475	17.5%	18.0%	20.5%
Sales	24,195	5.1%	3.6%	4.6%
TOTAL	475,865	100.0%	100.0%	100.0%

If one compares the figures for Tables 1 and 3, for a number of clusters there is a rough match between the distribution of jobs located in York Region and the distribution of employment among residents. Notably, York Region has a high proportion of Administrator jobs, just as it has a high proportion of residents employed as Administrators. Similarly, York Region has a smaller proportion of Server jobs compared to Toronto and the Rest of Ontario, and York residents are employed in these jobs in comparatively smaller proportions.

But in other clusters, there is more of a mismatch:

- Higher proportion of York Region residents employed, lower proportion of York Region jobs present (meaning more residents in these occupations leave York Region to go to work):
 - Rulemakers
 - Sustainers
 - Calculators
- Lower proportion of York Region residents employed, higher proportion of York Region jobs present (meaning more residents from outside York Region travel into the Region to work):
 - Labourers



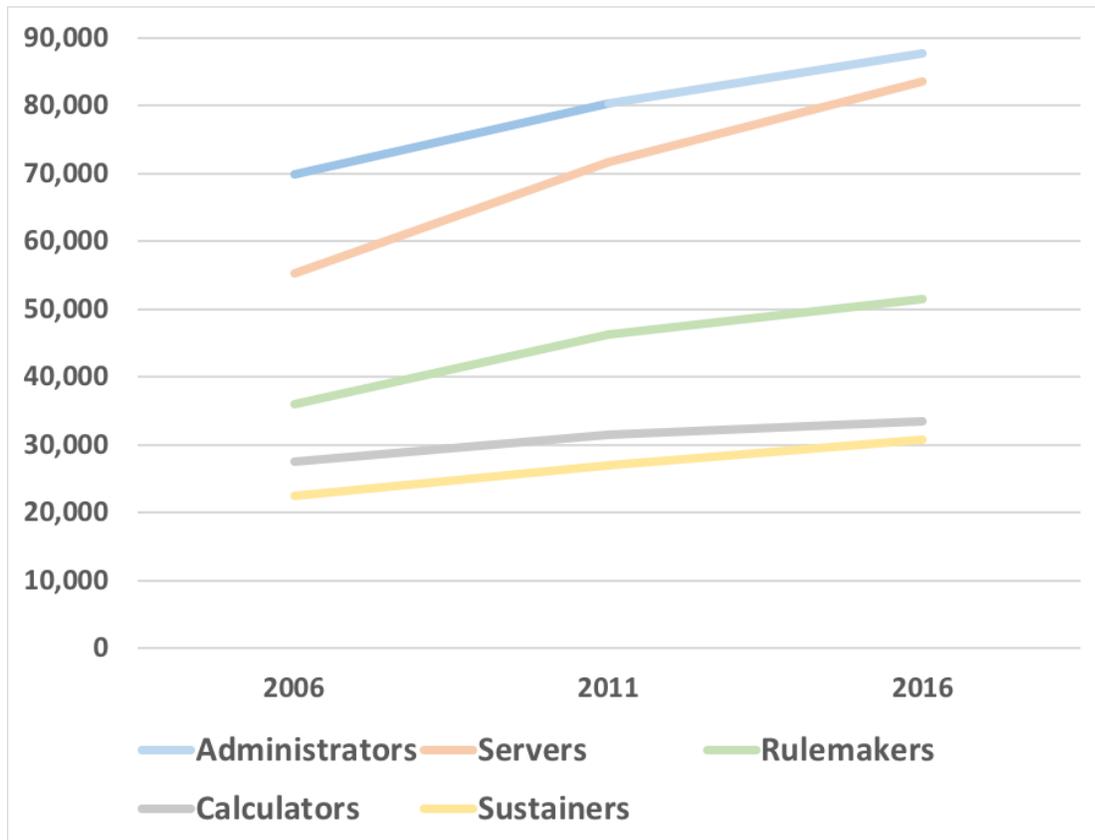
Growth trends among occupational clusters in York Region

York Region is a growing municipality. Between 2006 and 2016, its population increased by 24%, more than double the provincial average of 10%.

The increase in employed residents was 20%, meaning that a considerable proportion of that population increase was among people not in the labour force (children, youth attending school and retired seniors). The increase in the number of jobs located in York Region was 16%, as economic and employment growth typically lags population growth.

The change in the number of local jobs occurred at different rates by occupational clusters. The following two charts illustrate the change between 2006 and 2016 in the number of jobs located in York Region by the nine largest occupational clusters. Chart 2 illustrates five clusters which grew between 2006 and 2016, while Chart 3 highlights four clusters which either lost jobs or barely increased during this same period.

Chart 2: Five large occupational clusters with significant job growth in York Region, 2006-2016



The largest cluster, the Administrators, grew by 25% between 2006 and 2016 (Chart 2). The Server category, which had been the third largest cluster in 2006, vaulted over Blue-collarers to become the second largest cluster, thanks to a 51% increase. Rulemakers also experienced a significant increase, at 43%. Sustainers (37%) and Calculators (22%) also had healthy increases. Apart from Servers, these other four larger and higher-growth categories are among the top-five highest paid clusters.



Given York Region's overall population growth as well as jobs growth, it is surprising to see that three clusters actually registered job losses between 2006 and 2016 and one that virtually stayed flat (Chart 3). However, some explanations are required.



In the case of Makers and Labourers, many of these jobs are in Manufacturing or Construction. Because the local jobs statistic is limited to jobs with a fixed workplace, only around half of Construction jobs are actually counted, whereas Manufacturing jobs are almost all in a fixed location. Thus, losses in Manufacturing will have a larger impact on these two clusters, and so the loss of these jobs has a disproportionate impact.



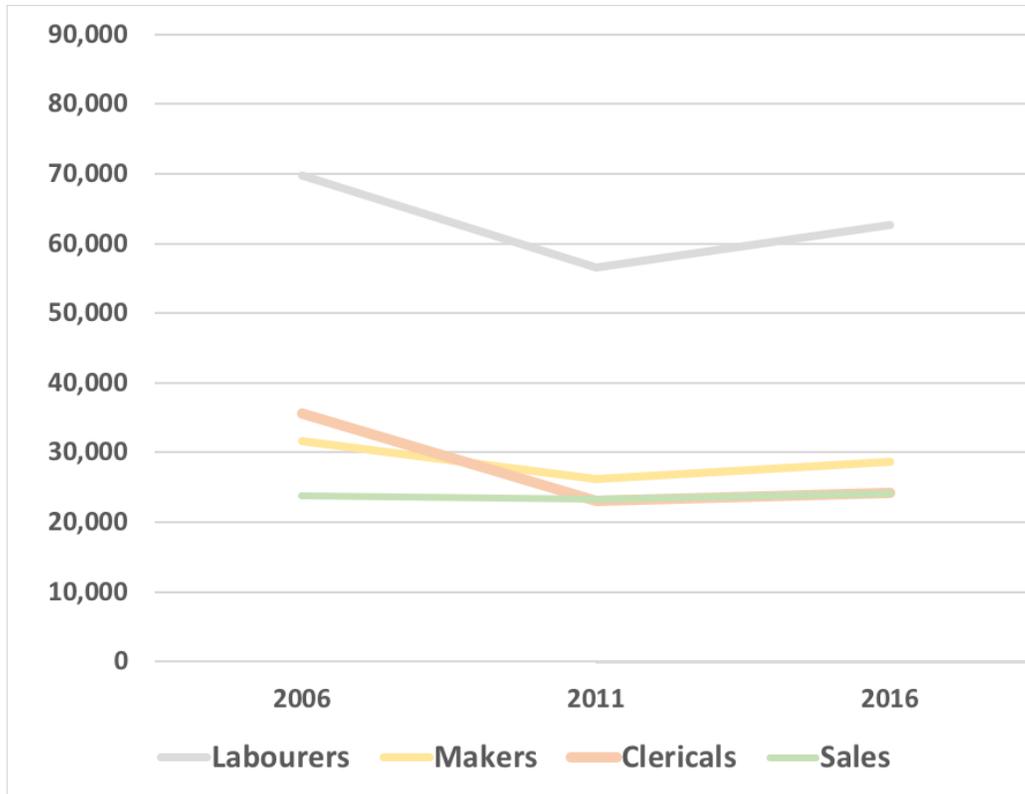
Another factor to consider is that the losses which were experienced all took place between 2006 and 2011, mainly a consequence of the 2008 recession. All four of these clusters witnessed job growth between 2011 and 2016.

Clerical jobs have been on a continuous decline across Ontario. Jobs such as receptionists and secretaries have been made redundant by automated phone systems, voice mails, on-line scheduling and other supportive technologies.



Sales jobs represent the retail trade sector. It is likely that the 2008 recession stalled any job growth in this sector, whereas on-line shopping may have started having an impact on employment among brick-and-mortar stores in the 2011-2016 period.

Chart 3: Four large occupational clusters with job losses or no growth in York Region, 2006-2016



Demographic features of occupational clusters

Who makes up these different occupational clusters? There are notable differences in the demographic mix of an occupational cluster compared to the average for the resident workforce. This section explores those differences for York Region residents, by gender, by immigrants and Canadian-born, and by visible minority status.

Occupational clusters and gender: Employment continues to reflect gender polarities by occupation. Chart 4 shows the gender split between males and females by occupational cluster. Most clusters have a predominant gender, where at least 60% (and usually higher) of its workers are either males or females (note how few occupations have their gender split close to the 50% mark). The gender split is particularly out of balance among Makers (95% male), Clericals (82% female) and Protectors (82% male), but also higher than 70% male among Labourers, Technologists and Calculators. The gender splits by cluster found in York Region are common throughout Ontario.

Chart 4: Gender divide by occupational clusters, employed residents, York Region, 2016

	Males	Females
ALL OCCUPATIONS	52%	48%
Rulemakers	54%	46%
Sustainers	28%	72%
Calculators	71%	29%
Artists	40%	61%
Administrators	48%	52%
Supporters	20%	80%
Technologists	76%	24%
Artisans	48%	52%
Protectors	82%	18%
Makers	95%	5
Labourers	76%	24%
Clericals	18%	82%
Servers	39%	62%
Sales	46%	54%

Occupational clusters and immigration status: There are fewer clusters where the distribution of residents by immigrant status substantially exceeds the average figure for all occupations. Among employed York Region residents, 52% are immigrants and 48% were born in Canada. Chart 5 illustrates the split by occupational clusters.

Two clusters are clear outliers: among Protectors, 78% are Canadian-born and only 22% are immigrants, while in the case of Calculators, 70% are immigrants and only 30% are Canadian-born.

Two other clusters have somewhat imbalanced splits:

- Artisans: 62% Canadian-born versus 38% immigrants;
- Blue collars: 60% immigrants versus 40% Canadian-born.

Both Sales (57%) and Sustainers (56%) have a slightly higher proportion of Canadian-born, compared to the York Region figure for all occupations (48%).

Chart 5: Divide between immigrants and Canadian-born by occupational clusters, employed residents, York Region, 2016

	Canadian-Born	Immigrants
ALL OCCUPATIONS	48%	52%
Rulemakers	48%	52%
Sustainers	56%	44%
Calculators	30%	70%
Artists	53%	47%
Administrators	49%	51%
Supporters	48%	52%
Technologists	41%	59%
Artisans	62%	38%
Protectors	78%	22%
Makers	52%	48%
Labourers	40%	60%
Clericals	51%	50%
Servers	48%	52%
Sales	57%	44%

Occupational clusters and visible minority status: The divide by visible minority status among all employed York Region residents is 53% non-visible minority and 47% visible minority. As in the case of other demographic categories, there are variations according to different occupational clusters, as evident in Chart 6.

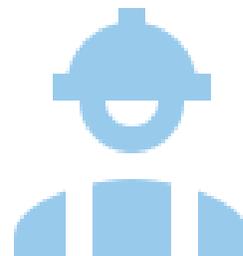
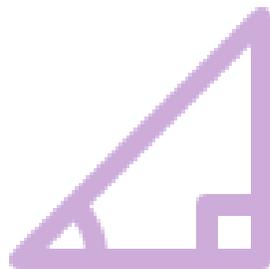


Chart 6: Divide according to visible minority status by occupational clusters, employed residents, York Region, 2016

	Non-Visible Minority	Visible Minority
ALL OCCUPATIONS	53%	47%
Rulemakers	54%	46%
Sustainers	60%	40%
Calculators	40%	60%
Artists	63%	37%
Administrators	57%	43%
Supporters	53%	47%
Technologists	49%	51%
Artisans	63%	38%
Protectors	78%	22%
Makers	67%	33%
Labourers	48%	52%
Clericals	52%	48%
Servers	47%	53%
Sales	53%	47%

Some of the outliers are similar to the ones for immigrants and Canadian-born, most notably, Protectors, where only 22% are members of a visible minority. Calculators also show an imbalance, although not as severe as that between immigrants and Canadian-born. On the other hand, larger imbalances are evident among other clusters, such as Makers (67% non-visible minority), Artists (63% non-visible minority) and Sustainers (60% non-visible minority).

In terms of all three of these dimensions (gender, immigrant status and visible minority status), only two clusters manifest clear concentrations across all measures profiled.

By far, Protectors stand out, being predominately male, Canadian-born and individuals not part of a visible minority. Calculators come next, also predominately male, with a high proportion of immigrants and a somewhat higher share of individuals who are members of a visible minority.

Commuting by occupational clusters

When statistics are provided regarding the occupations that residents are employed in or about the jobs present in a municipality, they appear as a static number. The truth is in a place like York Region, there is a tremendous amount of commuting which takes place, both out of and into York Region, and these flows greatly vary by occupational cluster.

One way to appreciate this dynamic is to compare the number of employed York Region residents to the actual number of York Region jobs in a given occupational cluster. In the case of Rulemakers, for example, there are close to 77,000 York Region residents employed in that cluster (Table 1), yet only 52,000 York Region jobs (Table 3). Clearly, the rest of these residents must be travelling elsewhere for work.

In fact, the volume of commuting represents even more than this net difference, as commuters from outside of York Region are employed in Rulemaker jobs in York Region, and more York Region residents commute outside of York Region than just the net mathematical surplus of workers.^[7] Chart 7 illustrates the degree of commuting in and out of York Region for workers employed as Rulemakers. The largest movement of Rulemakers are the 33,650 York Region residents leaving York Region for Toronto each day, representing slightly over half (53%) of York Region residents leaving their homes for work in that cluster. Another 23,250 York Region residents travel to Rulemaker jobs in York Region. They represent 37% of York Region residents working in that occupation. Another 8% off York Region residents travel to Peel Region (4,845 residents) to work in Rulemaker jobs.

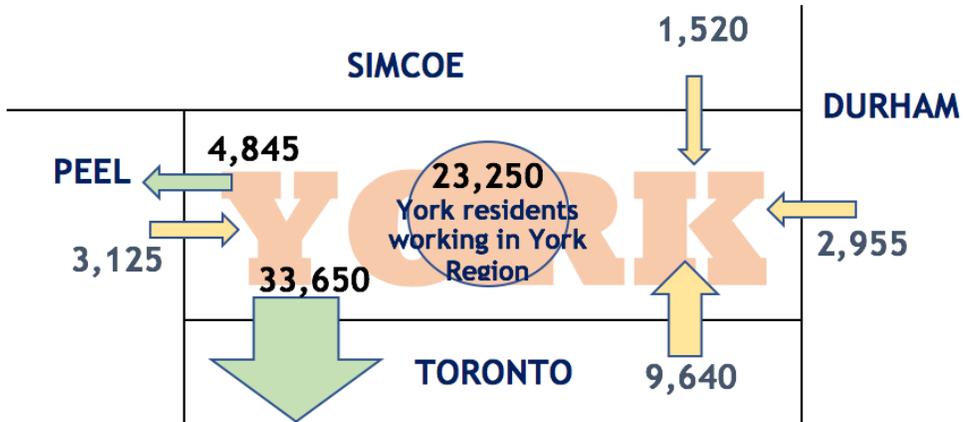


[7]The commuting data reflects individuals working in a usual place of work, not including working from home. The proportion of residents working from home varies by occupation. These statistics only reflect those individuals who leave home to go to work, which in most instances is the sizeable majority of workers.

Those 23,250 York Region residents travelling to Rulemaker jobs located in York Region account for 55% of all commuters travelling to York Region Rulemaker jobs. A further 23% are Toronto residents (9,640), 7% from Peel Region (3,125), 7% from Durham Region (2,955) and 4% from Simcoe County (1,520).



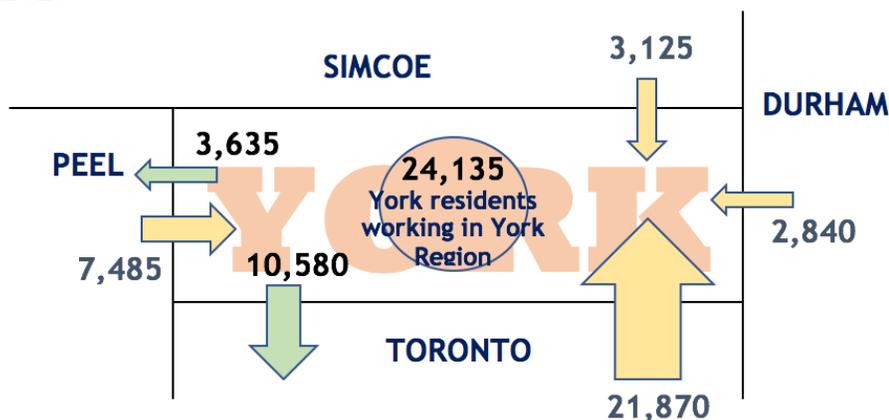
Chart 7: Commuting patterns of Rulemakers within, into and out of York Region, 2016



Map does not include all commuting but represents at least 90% of commuting.

A good contrasting example is that of Labourer workers (Chart 8). York Region residents commuting to jobs in York Region are the largest single commuting category. 60% of York Region residents working in the Labourer cluster work in York Region (24,135 York residents), but they only represent 40% of the Labourer jobs present in York Region. An almost equal amount of Toronto residents (21,870) commute to York Region for these jobs, taking up 36% of these jobs. 12% of these jobs are filled by Peel residents (7,485), a further 5% come from Durham (2,840) and another 5% from Simcoe (3,125).

Chart 8: Commuting patterns of Labourers within, into and out of York Region, 2016

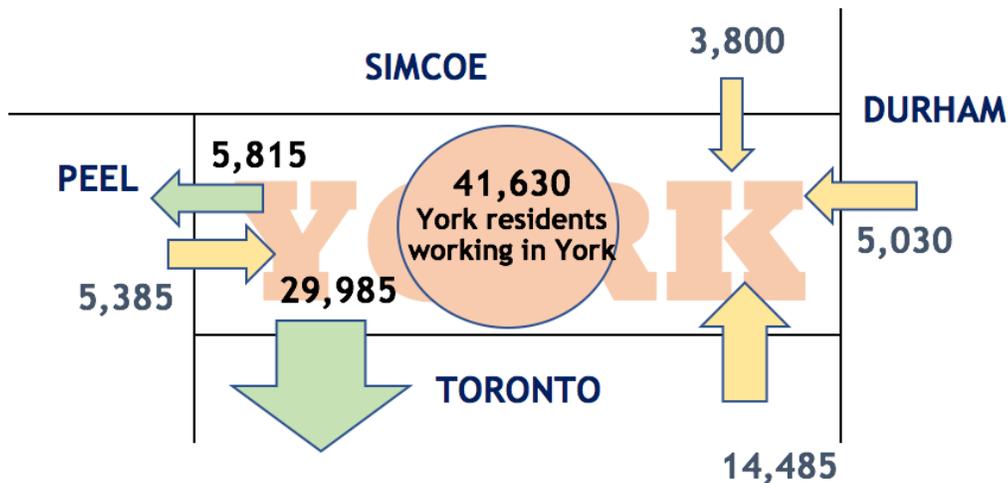


Map does not include all commuting but represents at least 90% of commuting.

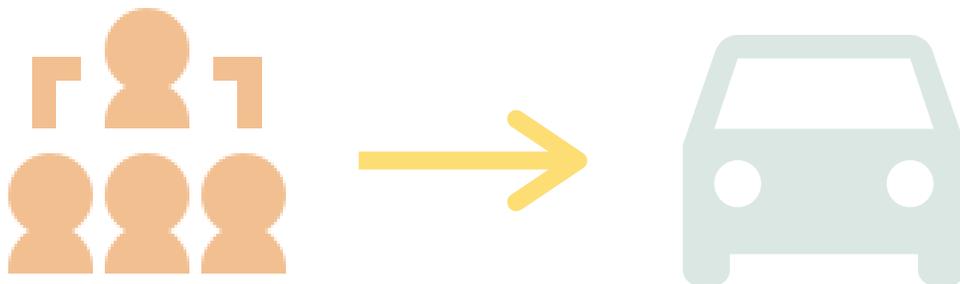
The Rulemaker cluster illustrates an occupational cluster where more than half of York Region residents working in that cluster travel out of York Region for work. The Labourer cluster is a case where most of the Labourer jobs in York Region are filled by residents who do not live in York Region.

The Administrator cluster accounts for the largest share of employed York Region residents (18.6%) as well as the largest proportion of jobs located in York Region (18.4%). For this cluster, the largest group of commuters is made up of those York residents travelling to Administrator jobs in York Region (41,630) (Chart 9). Yet almost half (48%) of York Region residents employed in this occupation travel outside York Region for work, even when there is such a large proportion of these jobs in York Region. In total, 38,365 York Region residents who are employed in the Administrator cluster travel outside of York Region for work, while at the same time 31,030 external residents commute into York Region for this same cluster of jobs

Chart 9: Commuting patterns of Administrators within, into and out of York Region, 2016

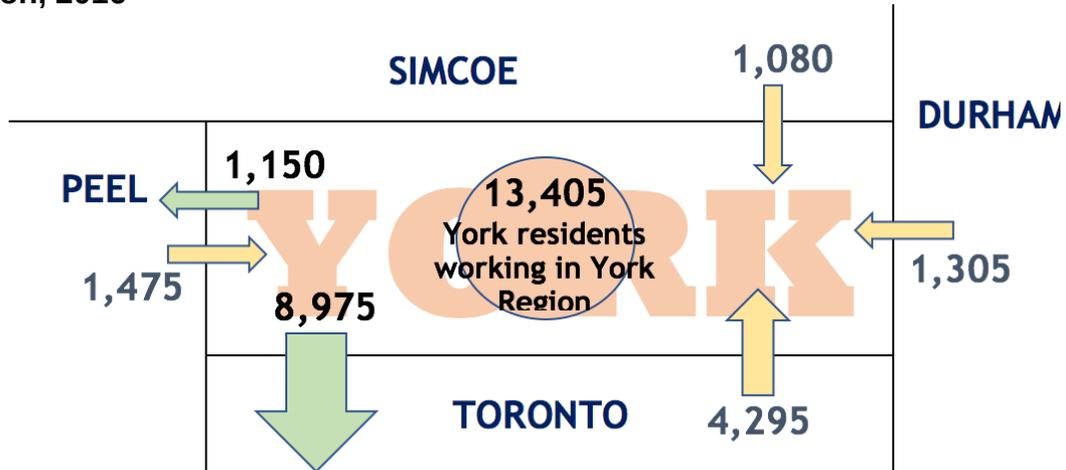


Map does not include all commuting but represents at least 90% of commuting.



Finally, in the case of Clericals (Chart 10), a larger proportion of York residents working as Clericals travel to Clerical jobs in York Region. These 13,405 York residents account for 56% of York residents employed as Clericals and they fill 61% of Clerical jobs that are located in York Region. Nevertheless, 44% of York residents working as Clericals travel outside York Region for work, with 37% commuting to Toronto (8,975 residents).

Chart 10: Commuting patterns of Clericals within, into and out of York Region, 2016



Map does not include all commuting but represents at least 90% of commuting

Chart 11 illustrates where York residents work, by occupational cluster. Calculators (32%) and Rulemakers (37%) are least likely to be working in their home region, while Sales (75%) and Servers (69%) are most likely to be working close to home.

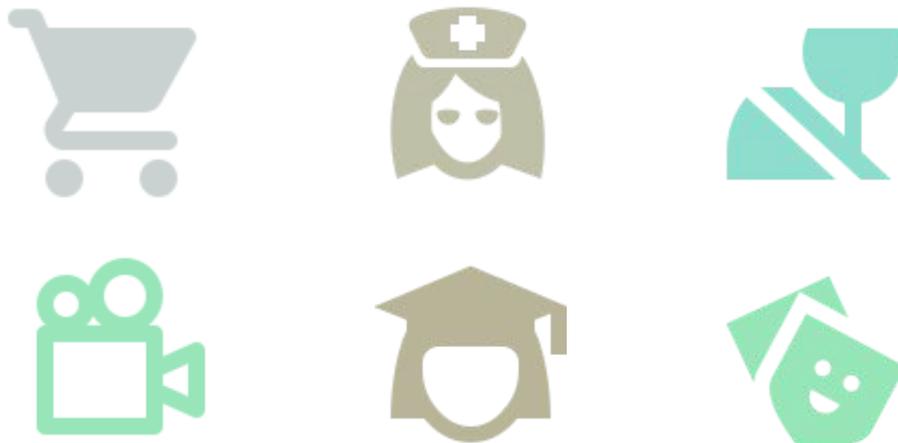
Chart 11: Location of work, York residents, by occupational clusters, 2016

WHERE YORK RESIDENTS WORK		
	York Region	Outside York
ALL OCCUPATIONS	53%	47%
Rulemakers	37%	63%
Sustainers	50%	50%
Calculators	32%	68%
Artists	55%	45%
Administrators	52%	48%
Supporters	59%	41%
Technologists	42%	58%
Artisans	64%	36%
Protectors	45%	55%
Makers	53%	47%
Labourers	60%	40%
Clericals	56%	44%
Servers	69%	32%
Sales	75%	26%

Chart 12: Location of residence, workers employed in York jobs, by occupational clusters, 2016

WHO WORKS IN YORK REGION JOBS		
	York Residents	Outside York
ALL OCCUPATIONS	56%	45%
Rulemakers	55%	45%
Sustainers	65%	35%
Calculators	46%	54%
Artists	64%	36%
Administrators	57%	43%
Supporters	66%	35%
Technologists	41%	59%
Artisans	67%	33%
Protectors	43%	57%
Makers	40%	60%
Labourers	40%	60%
Clericals	61%	39%
Servers	65%	35%
Sales	71%	29%

Chart 12 illustrates the residence of workers employed in jobs located in York Region. Makers (60%), Labourers (60%), Technologists (59%) and Protectors (57%) are jobs most likely to be filled by workers living outside York Region. There are a number of clusters where roughly two-thirds of the jobs are filled by York Region residents: Sales (71%); Artisans (67%); Supporters (66%); Sustainers (65%); Servers (65%); and Artists (64%).



Focusing more closely on "office workers"

Earlier, it was noted that among employed residents in York Region, there were higher proportions employed in the following four clusters:

- Rulemakers
- Administrators
- Calculators
- Clericals

Together, these clusters warrant closer examination. The following tables provide some comparisons between major urban areas in Ontario.

Table 4 compares the combined share of all employed residents working in these four clusters of Rulemakers, Calculators, Administrators and Clericals. The three areas with by far the highest proportions of these workers are Ottawa (46.6%), York (45.6%) and Halton (45.3%).

Table 4: Total percentage of residents employed as Rulemakers, Calculators, Administrators and Clericals (RCAC), 2016

Ottawa	46.6%
Durham	35.4%
York	45.6%
Toronto	40.8%
Peel	36.6%
Halton	45.3%
Hamilton	29.5%
Niagara	27.9%
Waterloo	33.5%
Essex (includes Windsor)	26.4%
Middlesex (includes London)	31.2%
Simcoe	27.8%

These jobs can span many industries. We have characterized the following industries as private sector office industries: Wholesale Trade; Finance and Insurance; Real Estate and Rental and Leasing; and Professional, Scientific and Technical Services. In this way, we exclude office workers in the public sector (for example, Public Administration or Health Care and Social Assistance), as well as exclude employees in these occupations working in the private sector who would not necessarily be working in an office (for example, Manufacturing or Accommodation and Food Services).

Table 5: Percentage of residents in “RCAC” occupations employed in “private sector office” industries, 2016

Ottawa	30.2%
Durham	41.1%
York	50.3%
Toronto	51.9%
Peel	45.8%
Halton	48.5%
Hamilton	36.3%
Niagara	30.4%
Waterloo	42.4%
Essex (includes Windsor)	31.5%
Middlesex (includes London)	38.6%
Simcoe	31.8%

Table 5 shows the proportion of all employed residents as Rulemakers, Calculators, Administrators and Clericals who are working in a private sector office industry. Once again, York is in the top three (second, at 50.3%), with Toronto in first (51.9%) and Halton third (48.5%). Ottawa's figure is much lower (30.2%), because so many of its Rulemakers, Calculators, Administrators and Clericals work in Public Administration, primarily in federal government jobs.

Table 6: Total percentage of local jobs among Rulemakers, Calculators, Administrators and Clericals (RCAC) clusters, 2016

Ottawa	48.2%
Durham	31.1%
York	41.8%
Toronto	47.4%
Peel	39.6%
Halton	37.3%
Hamilton	29.8%
Niagara	29.2%
Waterloo	35.7%
Essex (includes Windsor)	26.5%
Middlesex (includes London)	33.5%
Simcoe	29.1%

Tables 6 and 7 provide the same figures, but this time for the jobs present in these municipalities, as opposed to which occupations residents are employed in. Table 6 looks at the percentage of all local jobs which are in the Rulemakers, Calculators, Administrators and Clericals clusters. Once again, York is in the top three (41.4%), slightly edging out Peel and Halton. Ottawa, with its government jobs, is number one (48.2%) and Toronto is second (47.4%).

Table 7: Percentage of local jobs among “RCAC” occupations employed in “private sector office” industries, 2016

Ottawa	28.5%
Durham	17.7%
York	37.2%
Toronto	65.3%
Peel	41.0%
Halton	30.4%
Haliburton	25.9%
Niagara	24.4%
Waterloo	41.7%
Essex (includes Windsor)	26.7%
Middlesex (includes London)	37.7%
Simcoe	22.4%

Table 7 identifies what proportion of those Rulemakers, Calculators, Administrators and Clericals jobs are found among our private sector office industries. In this case, York comes in fifth, slightly behind 4th place Middlesex (London has a considerable finance and insurance sector).

Overall, York Region residents are considerably more likely to be employed in managerial, administrative and clerical jobs in private sector office industries, and it is only matched by residents of Halton Region in that respect.

In terms of jobs which are present within York Region, these same clusters are also prevalent, although there is a slightly smaller proportion (though still high) of these jobs among private sector office industries.



In short, a large part of York Region's labour market identity is represented by someone who works in an office in the private sector, where these occupations cover the span of functions, including manager, professional, supervisor, administrator, specialized sales and clerical.

Postscript: The post-pandemic labour market, remote work and York Region

The initial work on the occupational clusters and their application to York Region was undertaken before the pandemic overturned our lives. This section has been added because there was a compelling reason to apply the occupational cluster analysis to propose a prediction of how the aftermath of the pandemic may impact the dynamics of the labour market in York Region.

The COVID-19 pandemic has had an exceptional impact on our lives and its reverberations will be felt for some time. From a labour market perspective, one consequence of the lockdown has been the degree to which large numbers of employees actually worked from home. This unexpected experiment has proven to be successful, as employers have found that employees could be productive from home and that on-line platforms were generally effective as a way of holding meetings as well as for staying in touch. As a consequence, one-quarter of Chief Financial Officers have indicated they are planning to reduce their company's physical footprint and three-quarters plan to move more employees to work remotely on a permanent basis.^[8]

One way to estimate this impact is by assessing the degree to which an occupation has the potential for being performed from home.^[9] We have drawn on two recent studies to develop an estimate of the percentage of jobs in each occupational category which could plausibly be done from home.



Given the high proportion of York Region residents who are employed in office jobs in the private sector and given the high proportion of many of these same residents commuting outside York Region for employment, any permanent shift toward more work being done remotely will have considerable impact, and that impact is likely to be felt more strongly in York Region than in other parts of Ontario.



[8] Results from surveys undertaken by two consulting firms, as reported in Eric Andrew-Gee, "Is the office era over? The surprising truth about working from home," The Globe and Mail, May 29, 2020.
 [9] Zechuan Deng, Rene Morissette and Derek Messacar, "Running the economy remotely: Potential for working from home during and after COVID-19," StatCan COVID-19: Data to Insights for a Better Canada, May 28, 2020; Jonathan I. Dingel and Brent Neiman, "How Many Jobs Can be Done at Home?", Becker Friedman Institute, University of Chicago, April 2020. Our estimate of the potential for remote work by the occupational categories used to calculate the occupational clusters is presented in Appendix C.

Table 8 presents the results of all these calculations.

One of the important insights this calculation provides is that it highlights how many of these potential future remote workers fall within the four clusters of Rulemakers, Calculators, Administrators and Clericals.

The actual number who may continue to work from home, assuming the average rate of working from home was two days a week for those who could work from home,^[10] would total close to 54,000 residents (based on 2016 figures), 56% of whom were travelling outside York Region for work. While these individuals might be located in their homes, they would likely contribute to increased local demand for services, such as for office supplies, take-out coffee or lunch, recreational services and likely increased reliance generally on local shopping and local entertainment.

Table 8: The potential for remote work and its implications for different categories of commuters

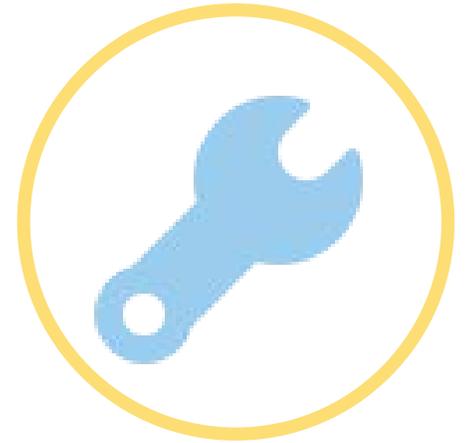
Occupational Cluster	Total number of residents working at home or at a usual place of work	Potential number of workers who could work from home	Number working at home before COVID	Remaining workers who could potentially work from home	
				Commuting to a job located in York Region	Commuting to a job outside York Region
Rulemakers	72,435	54,635	9,105	16,846	28,684
Sustainers	39,735	2,896	1,470	740	740
Calculators	45,085	34,867	6,730	9,004	19,133
Artists	4,130	2,065	1,495	314	257
Administrators	94,905	50,757	14,855	19,028	17,565
Supporters	18,625	2,451	1,085	854	593
Technologists	14,645	4,394	1,190	1,346	1,858
Artisans	10,480	5,240	1,930	2,118	1,192
Protectors	3,130	0	20	0	0
Makers	21,985	0	1,005	0	0
Labourers	41,625	386	1,565	64	42
Clericals	26,345	13,173	2,305	6,086	4,782
Servers	79,670	6,054	4,855	1,500	696
Sales	23,125	3,290	1,340	1,463	488
TOTAL POTENTIAL	495,920	180,208	48,950	59,363	76,030
Number switching from commuting to remote work					
Assuming work from home an average ONE day a week			11,873	15,206	
Assuming work from home an average TWO days a week			23,745	30,412	
Assuming work from home an average FOUR days a week			47,490	60,824	

In the case of York Region residents commuting to jobs within York Region, 86% belong to these four clusters. In the case of York Region residents commuting to jobs in these same clusters outside York Region, the figure is 92%.



[10] Two recent estimates for working from home suggest one to three days a week (Stanford Institute for Economic Policy Research, How working from home works out, Policy Brief, June 2020) or as high as 30% of the time for office workers (Boston Consulting Group, Governments must fix the skills mismatch for a post-COVID world, May 28, 2020).

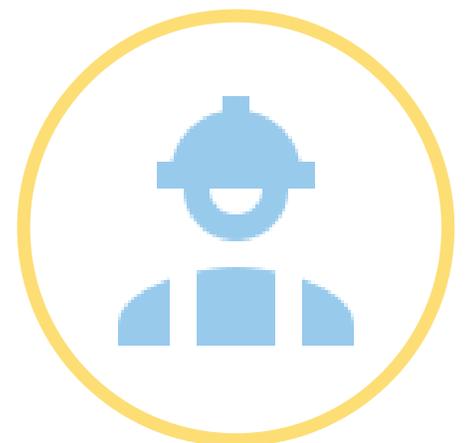
Based on 2016 statistics it is assumed that an occupation cannot be performed at home if it meets at least one of several criteria, such as the need to perform for or work directly with the public; to work outdoors; to operate or repair machinery and equipment; to inspect equipment, structures or materials; to wear common or specialized protective or safety equipment; to handle or move objects; or perform general physical activities. (This is drawn from the Dingel and Neiman study cited in footnote 7).



In a number of cases, for example Protectors, Makers and Labourers, the number of individuals working from home is greater than the potential number of residents working from home. This is because a slightly different definition of working from home is being used. In the case of the calculation of potential work at home, it is assessed the ability to carry out one's work functions in the home.



In the case of the number working at home, this would include individuals whose business address was one's home, even though one may go out of the home to perform one's work (for example, a plumber or electrician making house calls). A plumber or electrician's work cannot be performed in their own home, they need to deliver their services at a location outside their home.



Profiling each of the occupational clusters

The earlier statistics and figures describing the York Region labour market in terms of this collection of occupational clusters can also be itemized for each cluster, to provide a snapshot of the characteristics of each category. The following lists the features of the clusters in York Region, from largest to smallest, based on the number of jobs present in York Region in each of these clusters in 2016:



Administrators

Technicians supporting rulemakers: middle management in retail, customer service, skilled trades and production, as well as sales specialists

Administrators represent the largest proportion of jobs in York Region as well as the largest occupational cluster employing York Region residents. Around half (52%) of York Region residents who are employed as Administrators work in York Region, and most of the rest (38%) commute to Toronto to work. Most York Region Administrator jobs are filled by local residents (57%), with 20% commuting from Toronto and another 20% coming in almost equal parts from Peel, Durham and Simcoe.

York Region residents working as Administrators closely match the average proportions for all occupations in terms of gender split, immigrant and Canadian-born, and visible minority and not a visible minority. In short, this cluster is well representative of the York region workforce as a whole.



Servers

Personal support workers; food service supervisors; cooks; barbers; food and beverage servers; cashiers; cleaners; food counter attendants; shelf stockers

Servers are a rapidly growing cluster (increasing by 51% between 2006 and 2016), now accounting for the second largest proportion of jobs in York Region. Servers also make the least income of all 14 clusters, when calculating the average employment income of full-time, full-year workers.

Compared to Toronto or to the rest of Ontario, Servers make up a smaller proportion of local jobs and York Region residents are somewhat less likely to be employed as Servers, as opposed to residents living elsewhere. Roughly two-thirds (65%) of York Region Server jobs are filled by York Region residents and York Region residents are much less likely to commute outside York Region for Server jobs. Servers are more likely to be female (62%), as likely to be immigrants as Canadian-born, and slightly more likely to be a visible minority (53%).

York Region has more Administrator jobs than any other larger municipality or region in Ontario, and this number has been growing at a steady pace. Among the 14 occupational clusters, Administrators have an average annual income that ranks fifth.



Labourers

Installers, repairers: heavy equipment operators; transport truck drivers; machine operators and assemblers; labourers in construction, manufacturing

Labourers constitute the lower-skilled, entry-level portion of the workforce in such industries as Agriculture, Construction, Manufacturing and Transportation & Warehousing. In 2006, this cluster represented the second largest category of jobs in York Region, but declined by 10% to third place by 2016. All the decline was entirely due to losses in Manufacturing. In fact, between 2006 and 2011, Manufacturing jobs in the Labourer cluster in York Region dropped by one-third (32%), yet actually grew by 5% between 2011 and 2016.

It also bears emphasizing that when counting local jobs, the statistics do not include jobs which have no fixed workplace, so that in the case of Labourers, those employed in Construction are significantly under-counted, because slightly over half work at no fixed workplace. York Region residents are less likely to work in Labourer jobs: 9.8% are employed in this cluster compared to 14.5% of the rest of Ontario (not including Toronto).

Three-quarters of Labourer workers are males; they are more likely to be immigrants and slightly more likely to be a visible minority. Labourers earn the second lowest average employment income, just slightly higher than Servers.

Consequently, 60% of Labourer jobs located in York Region are filled by residents travelling from outside York Region (most of whom commute from Toronto). Vaughan is home to slightly over half (53%) of York Region's Labourer jobs that have a fixed workplace.





Calculators

Scientists, engineers, architects, mathematicians, IT professionals, policy researchers

Calculators represent the STEM professionals. Among York Region jobs, slightly more than half (55%) are IT professionals and another third (36%) are engineers. Half of these jobs are found in Professional, Technical & Scientific Services, another 15% in Manufacturing and 14% in Wholesale Trade.

There are far more York Region residents who work as Calculators (41,000 in 2016) than there are Calculator jobs in York Region (27,000). As a result, 54% of York Region Calculators commute to Toronto and another 9% commute to Peel.

Even with such a surplus of Calculators, less than half (46%) of York Region Calculator jobs are filled by York Region residents. 31% of these York Region jobs are filled by Toronto residents, another 10% come from Peel, 6% from Durham and 3% from Simcoe.

Calculator jobs in York Region have been increasing steadily, growing by 22% between 2006 and 2016. York Region residents working as Calculators have the 3rd highest average employment income among the 14 occupational clusters. Males form a large majority in this category (71%), as do immigrants (70%) and, to a slightly lesser extent, visible minorities (60%).



Sustainers

Professionals in health, education and social services: doctors, nurses, professors, teachers, social workers

Given their occupations, it is not surprising that of all York Region Sustainer jobs, slightly over half (56%) are in the Educational Services sector and another third (33%) are in Health Care & Social Assistance. In 2016, the three largest occupations among these York Region jobs were: Elementary School and Kindergarten Teachers (10,400); Secondary School Teachers (5,300); and Registered Nurses and Registered Psychiatric Nurses (3,900).

Although almost two-thirds (65%) of York Region Sustainer jobs are filled by York Region residents, fully half of York Region residents who work as Sustainers travel outside the region for their employment, most of them travelling to Toronto.

Sustainer jobs in York Region grew by 37% between 2006 and 2016 and they are the 4th best paid occupational cluster among the 14 categories. Sustainers are much more likely to be women (72%), whereas somewhat less likely to be an immigrant (44%) or a visible minority (40%).



Rulemakers

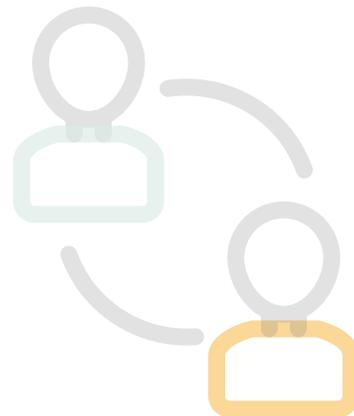
Leaders in organizations and supporting professionals: senior executives, lawyers, financial advisors and accountants

Rulemakers sit at the pinnacle of the career pyramid and York Region has a considerable proportion of its residents employed in this cluster. Among all municipalities and regions, York Region's 13.5% is the 4th highest proportion, after Halton (15.2%), Toronto (14.4%) and Ottawa (13.6%). Peel sits in 5th place, at 9.9%, which shows how the figures drop off after York's 13.5%.

But in terms of the jobs present in York Region, Rulemakers make up 10.8%, this time tied with Peel for 3rd place, with Toronto far out front (17.6%), followed by Ottawa (14.0%). Of York Region residents working as Rulemakers travelling to work each day, over 33,000 commute to Toronto while 23,000 have their jobs in York Region.

In total, 63% of York Region residents working as Rulemakers travel outside York Region for their employment. Rulemaker jobs in York Region have been growing at a significant pace: between 2006 and 2016, the number increased by 43%, more than double the 20% average for all occupations. Markham, which is home to 30% of York Region's jobs, has 38% of York Region's Rulemaker jobs.

Rulemakers earn the highest average employment income. Rulemakers are only slightly more likely to be males; Rulemakers are immigrants or members of a visible minority in close to the same proportion as the average for all occupations held by York Region residents.





Makers

Skilled trades contractors, supervisors and tradespersons; supervisors in primary industries and manufacturing; central control operators

Makers, like Labourers, work primarily in Manufacturing and Construction, and experienced a similar loss of jobs between 2006 and 2011, with a slight rebound by 2016. However, the single largest occupation in this cluster is Auto Service Technician, which is in the Other Services sector. The next largest occupations are Electricians, Machinists, Construction Millwrights and Industrial Mechanics, Tool and Die Makers, and Carpenters.

60% of Maker jobs in York Region are filled by residents commuting from outside the region. As in the case of Labourer jobs, Vaughan is home to slightly over half (53%) of York Region's Maker jobs that have a fixed workplace.

The vast majority of Makers are males (95%). While they are just as likely to be immigrants (48%) as Canadian-born (52%), they are notably less likely to be visible minorities (33%), a much lower share than that for Labourers (52%).



Sales

Retail sales supervisors and salespersons

Of all Sales jobs in York Region, 91% are retail salespersons (the rest are retail sales supervisors), and of all retail salespersons, 83% work in the Retail Trade sector. This is an occupational cluster which largely consists of one occupation in one industry. In Ontario, the number of Sales jobs decreased by 11% between 2006 and 2016. The fact that Sales jobs in York Region stayed steady during this timeframe (an increase of 2%) is a consequence of the region's population growth. The proportion of Sales jobs present in York Region is just slightly higher than what is found in Toronto or in the rest of Ontario.

Sales employees are least likely to commute farther distances for work. 75% of York Region residents employed in the Sales cluster work in York Region and 71% of York Region Sales jobs are filled by York Region residents. The average employment income of Sales workers is among the bottom third of the 14 occupational clusters.

Somewhat more women (54%) than men (46%) work in Sales jobs, although slightly fewer immigrants (44%). The proportion of visible minorities among Sales workers is exactly the same as the share of visible minorities found in all occupations that York Region residents are employed in (47%).



Clerical

General office workers, office clerks, receptionists, payroll administrators, survey interviewers

Among occupations and industries, it is well understood that Ontario has seen a decline in employment among the Manufacturing sector. What is often overlooked is how many entry-level clerical jobs have been lost. Between 1991 and 2016, employment in Ontario grew by a third (31%), yet employment in clerical occupations declined by a third (35%). These jobs made up 8.3% of the entire workforce in 1991; by 2016, that proportion had shrunken to 4.1%. In absolute terms, during that 25-year span, Ontario lost 147,000 clerical jobs. If clerical jobs had maintained the same share of the workforce, that loss would represent 279,000 jobs.

This is the context for understanding Clerical jobs in York Region. Between 2006 and 2011, York Region lost 35% of its Clerical jobs, whereas this category grew by 6% between 2011 and 2016. The net loss between 2006 and 2016 was a drop of 32%. Clerical jobs went from being the 5th largest occupational cluster in 2006 to tied for 8th in 2016.

The vast majority of Clerical workers are female (82%), with a roughly equal divide between Canadian-born and immigrant, and between visible minority and not a visible minority person.



Nevertheless, York Region has a slightly higher proportion of Clerical jobs than the average for the province, as well as a slightly higher proportion of residents who work in Clerical occupations. 61% of York Region Clerical jobs are filled by York Region residents.



Supporters

Technicians supporting sustainers: medical and dental technologists and technicians; paralegals, community service workers, early childhood educators

Supporters account for a smaller proportion of employment in York Region, accounting for 3.6% of all local jobs, making this category the 10th largest cluster out of 14 clusters. This category, however, accounted for the largest percentage increase in York Region jobs between 2006 and 2016, posting growth of 61%. This increase was experienced across a range of diverse occupations: dental hygienists and dental therapists; opticians; midwives and practitioners of natural healing; licensed practical nurses; early childhood educators and assistants, among others.

Supporters are less likely to commute outside York Region. 59% of York Region residents employed as Supporters work in York Region; 66% of York Region Supporter jobs are filled by York Region residents.

Although Supporter jobs usually require a college diploma, the average employment income for these jobs is in the bottom half of the 14 occupational clusters. The average income for this group is pulled down by the lower incomes earned by early childhood educators.

Supporters are predominately female (80%), and the same proportion of immigrants and members of a visible minority work as Supporters as the average proportion across all occupations that York Region residents are employed in.



Artists

Editors, journalists, writers, librarians, producers, directors, actors, dancers, musicians, painters

Among York Region Artist jobs, the largest occupation (59%) is creative and performing artists, a large portion of whom provide instruction via Educational Services. Writers, journalists, translators and editors (35%) work in Information & Cultural Industries; Professional, Scientific & Technical Services; and Arts, Entertainment & Recreation. The remaining 6% are librarians, archivists and curators.

Toronto has a higher proportion of Artists jobs, making up 2% of their total employment. In York Region as well as the rest of Ontario, this cluster accounts for 0.8% of jobs. While 64% of York Region Artist jobs are filled by York Region residents, 45% of York Region residents employed as Artists need to commute outside of the region for work, almost all of them travelling to Toronto.



Technologists

Technicians supporting calculators: technologists and technicians in science, engineering and IT; air pilots and air traffic controllers

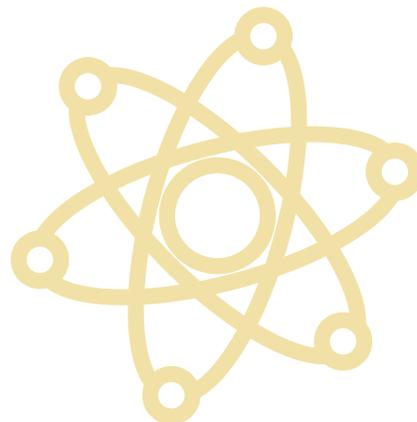
Where Calculators are the STEM professionals, Technologists are the STEM technicians. They are employed across a range of industries in York Region: Professional, Scientific & Technical Services (28%); Manufacturing (19%); Construction (12%); and Wholesale Trade (11%).

Yet despite this near equivalence of employed residents and local jobs, only 42% of these Technologist residents commuting within York Region for work, and 59% of York Region Technologist jobs were filled by employees who lived outside York Region.

Technologist jobs in York Region have only grown by 8% between 2006 and 2016, compared to the 22% increase among Calculator jobs. Among the 14 occupational clusters, the average employment income for Technologists living in York Region ranks 6th.

Like Calculators, Technologists are largely males (76%), slightly more likely to be immigrants (59%) and as likely to be a member of a visible minority (51%) as not a visible minority (49%).

In 2016, approximately 17,000 York Region residents were employed as Technologists, and there were approximately 15,200 Technologists jobs in York Region.





Artisans

Technicians supporting artists: photographers, camera operators, graphic artists, graphic designers, recording technicians, coaches, athletes

This cluster includes a diverse range of occupations. Among Artisan jobs in York Region, 44% are coaches and program instructors, mainly employed in Arts, Entertainment & Recreation (for example, gyms), Educational Services (athletics departments) and Public Administration (municipal recreational programs). The next largest category, accounting for 42%, are creative designers and craftspersons, working in Professional, Scientific & Technical Services, Manufacturing and Retail Trade. The remaining occupations (16%) include photographers, video and audio technicians, library and museum technicians, and announcers.

Approximately 2% of York Region residents are employed as Artisans and around 2% of York Region jobs are in the Artisan category. The average employment income of Artisans falls in the bottom third of the 14 occupational clusters, and they are less likely to commute outside York Region for employment. 64% of York Region residents employed as Artisans work in York Region, and 67% of York Region Artisan jobs are filled by York Region residents.

Artisans are almost even divided between females (52%) and males (48%) but are somewhat more likely to be Canadian-born (62%) as well as not a visible minority (63%).



Protectors

Police officers, firefighters, non-commissioned military staff, sheriffs, bailiffs, correctional service officers

This is the smallest occupational cluster, accounting for less than 1% of all jobs in York Region, yet it has a number of distinctive features. Among these York Region jobs, 71% are police officers, 28% are firefighters and the remaining 11% are made up of sheriffs, bailiffs, by-law enforcement officers and Canadian Armed Forces soldiers.

Only 45% of York Region residents who work as Protectors have jobs within York Region and among York Region Protector jobs, 57% are filled by residents from outside the region. It is not uncommon for police officers to live away from the community where they work. In Toronto and Peel Region, less than one-quarter of their police officers live in the region where they work.

York Region residents working as Protectors have the 2nd highest average employment income among the 14 occupational clusters. A large majority of Protectors are males (82%), Canadian-born (78%) and not a visible minority (78%).

Concluding observations

This report introduces a unique framework for describing a labour market, one based on a combination of occupational categories and different skill levels, clustering occupations by common functional or industry characteristics. It is not meant to replace the well-known classification structures for occupations (NOC - National Occupational Classification) and industries (NAICS - North American Industry Classification System). Instead, these occupational clusters highlight similar groups of occupations and in this way offers a simpler narrative to portray a local labour force.

This framework reshuffles 10 occupational categories, five skill levels and 20 industry sectors into 14 occupational clusters. These categories are hardly perfect, but they have a consistency which we feel provides an intuitive way to represent the essential characteristics of a local labour market. This framework offers a different lens through which to view the mix of jobs in a local area and the mix of occupations which local residents are employed in.

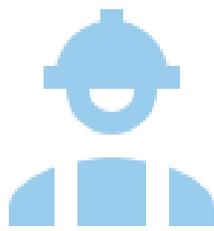
Several observations emerge from the preceding analysis of data:

- From an economic development perspective, one could assert that York Region has a unique identity, defined by a large proportion of its residents working in office jobs, typically in such private sector industries as Wholesale Trade; Finance and Insurance; Real Estate and Rental and Leasing; and Professional, Scientific and Technical Services.
- The Administrators cluster is particularly pronounced in York Region, both in terms of jobs which are present in York Region and with respect to a significant proportion of residents employed in this category. As well, other office functions are also present in considerable numbers, represented by the clusters of Rulemakers, Calculators and Clericals. Overall, the labour market picture for York Region is represented by this span of office functions, including manager, professional, supervisor, administrator, specialized sales and clerical.
- While not limited to an occupational cluster analysis, it is striking to observe the extent of commuter traffic, often travelling in both directions for the same occupational cluster. This represents such a significant cost, not only financially but also the strain on people's time as well as on the planet's environment.
- There may be a great incentive for both employers and for employees to make greater use of work from home options.

The pandemic may turn out to be a disruptive event in this pattern and York Region may be most affected by this change, because of the large proportion of workers in occupations which can be performed from home as well as the large proportion of workers in those categories who travel outside of York Region for those jobs.



- It is also important to point out that the top four occupational clusters, both in terms of what occupations York Region residents are employed in as well as the jobs which are present in York Region, highlight a polarized labour market. At one end are Administrators and Rulemakers, at the other end are Servers and Labourer workers.
- That polarization has only been demonstrated in terms of employment income in this report, but one can be certain this disparity is also apparent in the higher level of precarious work among these Servers and Labourers.
- This report was undertaken before the COVID-19 pandemic descended upon us. It is still far too early to assess what its consequences will be upon the Canadian, Ontario or York Region labour markets, but there are many reasons to be concerned. It is noteworthy, in that regard, that those who have become our essential workers, the personal support workers, the grocery staff cashiers and shelf-stockers, the delivery drivers, the warehouse goods handlers, the cooks and food counter attendants, the cleaners, the public transit operators, all fall within these two clusters of Servers and Labourers.
- This crisis has thrown into sharp relief the deleterious impact that precarious work and the gig economy has had on these workers, perhaps none more so than those who staff our long-term care facilities. The growing reliance on contract work and part-time employment has resulted in workers needing to cobble together jobs in several facilities to make ends meet. Those circumstances were never adequate for these workers and it turns out that these arrangements were even more harmful to the residents in their care.
- In these various ways, the COVID pandemic may provoke a re-think of these labour market issues, from the incidence of commuting to the precarious work conditions of lower-paid workers. That is the ultimate purpose of such data analysis, to suggest areas of improving our local labour market dynamic to benefit the lives of all residents of our community.



APPENDIX A: 4-DIGIT NOC OCCUPATIONS FOR EACH OCCUPATIONAL CLUSTER



Rulemakers

- 0011 Legislators
- 0012 Senior government managers and officials
- 0013 Senior managers - financial, communications and other business services
- 0014 Senior managers - health, education, social and community services and membership organizations
- 0015 Senior managers - trade, broadcasting and other services, n.e.c.
- 0016 Senior managers - construction, transportation, production and utilities
- 0111 Financial managers
- 0112 Human resources managers
- 0113 Purchasing managers
- 0114 Other administrative services managers
- 0121 Insurance, real estate and financial brokerage managers
- 0122 Banking, credit and other investment managers
- 0124 Advertising, marketing and public relations managers
- 0125 Other business services managers
- 0131 Telecommunication carriers managers
- 0132 Postal and courier services managers
- 0211 Engineering managers
- 0212 Architecture and science managers
- 0213 Computer and information systems managers
- 0311 Managers in health care
- 0411 Government managers - health and social policy development and program administration
- 0412 Government managers - economic analysis, policy development and program administration
- 0413 Government managers - education policy development and program administration
- 0414 Other managers in public administration
- 0421 Administrators - post-secondary education and vocational training
- 0422 School principals and administrators of elementary and secondary education
- 0423 Managers in social, community and correctional services
- 0431 Commissioned police officers
- 0432 Fire chiefs and senior firefighting officers
- 0433 Commissioned officers of the Canadian Armed Forces
- 0511 Library, archive, museum and art gallery managers
- 0512 Managers - publishing, motion pictures, broadcasting and performing arts
- 0513 Recreation, sports and fitness program and service directors
- 1111 Financial auditors and accountants
- 1112 Financial and investment analysts
- 1113 Securities agents, investment dealers and brokers
- 1114 Other financial officers
- 1121 Human resources professionals
- 1122 Professional occupations in business management consulting
- 1123 Professional occupations in advertising, marketing and public relations
- 4111 Judges
- 4112 Lawyers and Quebec notaries



Sustainers

3011 Nursing coordinators and supervisors
 3012 Registered nurses and registered psychiatric nurses
 3111 Specialist physicians
 3112 General practitioners and family physicians
 3113 Dentists
 3114 Veterinarians
 3121 Optometrists
 3122 Chiropractors
 3124 Allied primary health practitioners
 3125 Other professional occupations in health diagnosing and treating
 3131 Pharmacists
 3132 Dietitians and nutritionists
 3141 Audiologists and speech-language pathologists
 3142 Physiotherapists
 3143 Occupational therapists
 3144 Other professional occupations in therapy and assessment
 4011 University professors and lecturers
 4012 Post-secondary teaching and research assistants
 4021 College and other vocational instructors
 4031 Secondary school teachers
 4032 Elementary school and kindergarten teachers
 4033 Educational counsellors
 4151 Psychologists
 4152 Social workers
 4153 Family, marriage and other related counsellors
 4154 Professional occupations in religion
 4155 Probation and parole officers and related occupations
 4156 Employment counsellors



Artists

5111 Librarians
 5112 Conservators and curators
 5113 Archivists
 5121 Authors and writers
 5122 Editors
 5123 Journalists
 5125 Translators, terminologists and interpreters
 5131 Producers, directors, choreographers and related occupations
 5132 Conductors, composers and arrangers
 5133 Musicians and singers
 5134 Dancers
 5135 Actors and comedians
 5136 Painters, sculptors and other visual artists



Calcuators

2111 Physicists and astronomers
 2112 Chemists
 2113 Geoscientists and oceanographers
 2114 Meteorologists and climatologists
 2115 Other professional occupations in physical sciences
 2121 Biologists and related scientists
 2122 Forestry professionals
 2123 Agricultural representatives, consultants and specialists
 2131 Civil engineers
 2132 Mechanical engineers
 2133 Electrical and electronics engineers
 2134 Chemical engineers
 2141 Industrial and manufacturing engineers
 2142 Metallurgical and materials engineers
 2143 Mining engineers
 2144 Geological engineers
 2145 Petroleum engineers
 2146 Aerospace engineers
 2147 Computer engineers (except software engineers and designers)
 2148 Other professional engineers, n.e.c.
 2151 Architects
 2152 Landscape architects
 2153 Urban and land use planners
 2154 Land surveyors
 2161 Mathematicians, statisticians and actuaries
 2171 Information systems analysts and consultants
 2172 Database analysts and data administrators
 2173 Software engineers and designers
 2174 Computer programmers and interactive media developers
 2175 Web designers and developers
 4161 Natural and applied science policy researchers, consultants and program officers
 4162 Economists and economic policy researchers and analysts
 4163 Business development officers and marketing researchers and consultants
 4164 Social policy researchers, consultants and program officers
 4165 Health policy researchers, consultants and program officers
 4166 Education policy researchers, consultants and program officers
 4167 Recreation, sports and fitness policy researchers, consultants and program officers
 4168 Program officers unique to government
 4169 Other professional occupations in social science, n.e.c.



Administrators

0601 Corporate sales managers
 0621 Retail and wholesale trade managers
 0631 Restaurant and food service managers
 0632 Accommodation service managers
 0651 Managers in customer and personal services, n.e.c.
 0711 Construction managers
 0712 Home building and renovation managers
 0714 Facility operation and maintenance managers
 0731 Managers in transportation
 0811 Managers in natural resources production and fishing
 0821 Managers in agriculture
 0822 Managers in horticulture
 0823 Managers in aquaculture
 0911 Manufacturing managers
 0912 Utilities managers
 1211 Supervisors, general office and administrative support workers
 1212 Supervisors, finance and insurance office workers
 1213 Supervisors, library, correspondence and related information workers
 1214 Supervisors, mail and message distribution occupations
 1215 Supervisors, supply chain, tracking and scheduling co-ordination occupations
 1221 Administrative officers
 1222 Executive assistants
 1223 Human resources and recruitment officers
 1224 Property administrators
 1225 Purchasing agents and officers
 1226 Conference and event planners
 1227 Court officers and justices of the peace
 1228 Employment insurance, immigration, border services and revenue officers
 1241 Administrative assistants
 1242 Legal administrative assistants
 1243 Medical administrative assistants
 1251 Court reporters, medical transcriptionists and related occupations
 1252 Health information management occupations
 1253 Records management technicians
 1254 Statistical officers and related research support occupations
 1311 Accounting technicians and bookkeepers
 1312 Insurance adjusters and claims examiners
 1313 Insurance underwriters
 1314 Assessors, valuers and appraisers
 1315 Customs, ship and other brokers
 6221 Technical sales specialists - wholesale trade
 6222 Retail and wholesale buyers
 6231 Insurance agents and brokers
 6232 Real estate agents and salespersons
 6235 Financial sales representatives
 6411 Sales and account representatives - wholesale trade (non-technical)



Supporters

- 3211 Medical laboratory technologists
- 3212 Medical laboratory technicians and pathologists' assistants
- 3213 Animal health technologists and veterinary technicians
- 3214 Respiratory therapists, clinical perfusionists and cardiopulmonary technologists
- 3215 Medical radiation technologists
- 3216 Medical sonographers
- 3217 Cardiology technologists and electrophysiological diagnostic technologists, n.e.c.
- 3219 Other medical technologists and technicians (except dental health)
- 3221 Denturists
- 3222 Dental hygienists and dental therapists
- 3223 Dental technologists, technicians and laboratory assistants
- 3231 Opticians
- 3232 Practitioners of natural healing
- 3233 Licensed practical nurses
- 3234 Paramedical occupations
- 3236 Massage therapists
- 3237 Other technical occupations in therapy and assessment
- 4211 Paralegal and related occupations
- 4212 Social and community service workers
- 4214 Early childhood educators and assistants
- 4215 Instructors of persons with disabilities
- 4216 Other instructors
- 4217 Other religious occupations



Protectors

- 4311 Police officers (except commissioned)
- 4312 Firefighters
- 4313 Non-commissioned ranks of the Canadian Armed Forces
- 4421 Sheriffs and bailiffs
- 4422 Correctional service officers
- 4423 By-law enforcement and other regulatory officers, n.e.c.



Technologists

- 2211 Chemical technologists and technicians
- 2212 Geological and mineral technologists and technicians
- 2221 Biological technologists and technicians
- 2222 Agricultural and fish products inspectors
- 2223 Forestry technologists and technicians
- 2224 Conservation and fishery officers
- 2225 Landscape and horticulture technicians and specialists
- 2231 Civil engineering technologists and technicians
- 2232 Mechanical engineering technologists and technicians
- 2233 Industrial engineering and manufacturing technologists and technicians
- 2234 Construction estimators
- 2241 Electrical and electronics engineering technologists and technicians
- 2242 Electronic service technicians (household and business equipment)
- 2243 Industrial instrument technicians and mechanics
- 2244 Aircraft instrument, electrical and avionics mechanics, technicians and inspectors
- 2251 Architectural technologists and technicians
- 2252 Industrial designers
- 2253 Drafting technologists and technicians
- 2254 Land survey technologists and technicians
- 2255 Technical occupations in geomatics and meteorology
- 2261 Non-destructive testers and inspection technicians
- 2262 Engineering inspectors and regulatory officers
- 2263 Inspectors in public and environmental health and occupational health and safety
- 2264 Construction inspectors
- 2271 Air pilots, flight engineers and flying instructors
- 2272 Air traffic controllers and related occupations
- 2273 Deck officers, water transport
- 2274 Engineer officers, water transport
- 2275 Railway traffic controllers and marine traffic regulators
- 2281 Computer network technicians
- 2282 User support technicians
- 2283 Information systems testing technicians



Artisans

5211 Library and public archive technicians
 5212 Technical occupations related to museums and art galleries
 5221 Photographers
 5222 Film and video camera operators
 5223 Graphic arts technicians
 5224 Broadcast technicians
 5225 Audio and video recording technicians
 5226 Other technical and coordinating occupations in motion pictures, broadcasting and the arts
 5227 Support occupations in motion pictures, broadcasting, photography and the performing arts
 5231 Announcers and other broadcasters
 5232 Other performers, n.e.c.
 5241 Graphic designers and illustrators
 5242 Interior designers and interior decorators
 5243 Theatre, fashion, exhibit and other creative designers
 5244 Artisans and craftspersons
 5245 Patternmakers - textile, leather and fur products
 5251 Athletes
 5252 Coaches
 5253 Sports officials and referees
 5254 Program leaders and instructors in recreation, sport and fitness



Clericals

1411 General office support workers
 1414 Receptionists
 1415 Personnel clerks
 1416 Court clerks
 1422 Data entry clerks
 1423 Desktop publishing operators and related occupations
 1431 Accounting and related clerks
 1432 Payroll administrators
 1434 Banking, insurance and other financial clerks
 1435 Collectors
 1451 Library assistants and clerks
 1452 Correspondence, publication and regulatory clerks
 1454 Survey interviewers and statistical clerks



Makers

- 7201 Contractors and supervisors, machining, metal forming, shaping and erecting trades and related occupations
- 7202 Contractors and supervisors, electrical trades and telecommunications occupations
- 7203 Contractors and supervisors, pipefitting trades
- 7204 Contractors and supervisors, carpentry trades
- 7205 Contractors and supervisors, other construction trades, installers, repairers and servicers
- 7231 Machinists and machining and tooling inspectors
- 7232 Tool and die makers
- 7233 Sheet metal workers
- 7234 Boilermakers
- 7235 Structural metal and platework fabricators and fitters
- 7236 Ironworkers
- 7237 Welders and related machine operators
- 7241 Electricians (except industrial and power system)
- 7242 Industrial electricians
- 7243 Power system electricians
- 7244 Electrical power line and cable workers
- 7245 Telecommunications line and cable workers
- 7246 Telecommunications installation and repair workers
- 7247 Cable television service and maintenance technicians
- 7251 Plumbers
- 7252 Steamfitters, pipefitters and sprinkler system installers
- 7253 Gas fitters
- 7271 Carpenters
- 7272 Cabinetmakers
- 7281 Bricklayers
- 7282 Concrete finishers
- 7283 Tilesetters
- 7284 Plasterers, drywall installers and finishers and lathers
- 7291 Roofers and shinglers
- 7292 Glaziers
- 7293 Insulators
- 7294 Painters and decorators (except interior decorators)
- 7295 Floor covering installers
- 7301 Contractors and supervisors, mechanic trades
- 7302 Contractors and supervisors, heavy equipment operator crews
- 7303 Supervisors, printing and related occupations
- 7304 Supervisors, railway transport operations
- 7305 Supervisors, motor transport and other ground transit operators
- 7311 Construction millwrights and industrial mechanics
- 7312 Heavy-duty equipment mechanics
- 7313 Heating, refrigeration and air conditioning mechanics
- 7314 Railway carmen/women
- 7315 Aircraft mechanics and aircraft inspectors
- 7316 Machine fitters
- 7318 Elevator constructors and mechanics

7321 Automotive service technicians, truck and bus mechanics and mechanical repairers
 7322 Motor vehicle body repairers
 7331 Oil and solid fuel heating mechanics
 7332 Appliance servicers and repairers
 7333 Electrical mechanics
 7334 Motorcycle, all-terrain vehicle and other related mechanics
 7335 Other small engine and small equipment repairers
 7361 Railway and yard locomotive engineers
 7362 Railway conductors and brakemen/women
 7371 Crane operators
 7372 Drillers and blasters - surface mining, quarrying and construction
 7373 Water well drillers
 7381 Printing press operators
 7384 Other trades and related occupations, n.e.c.
 8211 Supervisors, logging and forestry
 8221 Supervisors, mining and quarrying
 8222 Contractors and supervisors, oil and gas drilling and services
 8231 Underground production and development miners
 8232 Oil and gas well drillers, servicers, testers and related workers
 8241 Logging machinery operators
 8252 Agricultural service contractors, farm supervisors and specialized livestock workers
 8255 Contractors and supervisors, landscaping, grounds maintenance and horticulture services
 8261 Fishing masters and officers
 8262 Fishermen/women
 9211 Supervisors, mineral and metal processing
 9212 Supervisors, petroleum, gas and chemical processing and utilities
 9213 Supervisors, food and beverage processing
 9214 Supervisors, plastic and rubber products manufacturing
 9215 Supervisors, forest products processing
 9217 Supervisors, textile, fabric, fur and leather products processing and manufacturing
 9221 Supervisors, motor vehicle assembling
 9222 Supervisors, electronics manufacturing
 9223 Supervisors, electrical products manufacturing
 9224 Supervisors, furniture and fixtures manufacturing
 9226 Supervisors, other mechanical and metal products manufacturing
 9227 Supervisors, other products manufacturing and assembly
 9231 Central control and process operators, mineral and metal processing
 9232 Central control and process operators, petroleum, gas and chemical processing
 9235 Pulping, papermaking and coating control operators
 9241 Power engineers and power systems operators
 9243 Water and waste treatment plant operators



Sales

6211 Retail sales supervisors
 6421 Retail salespersons



Labourers

1511 Mail, postal and related workers
 1512 Letter carriers
 1513 Couriers, messengers and door-to-door distributors
 1521 Shippers and receivers
 1522 Storekeepers and partspersons
 1523 Production logistics co-ordinators
 1524 Purchasing and inventory control workers
 1525 Dispatchers
 1526 Transportation route and crew schedulers
 7441 Residential and commercial installers and servicers
 7442 Waterworks and gas maintenance workers
 7444 Pest controllers and fumigators
 7445 Other repairers and servicers
 7451 Longshore workers
 7452 Material handlers
 7511 Transport truck drivers
 7512 Bus drivers, subway operators and other transit operators
 7513 Taxi and limousine drivers and chauffeurs
 7514 Delivery and courier service drivers
 7521 Heavy equipment operators (except crane)
 7522 Public works maintenance equipment operators and related workers
 7531 Railway yard and track maintenance workers
 7532 Water transport deck and engine room crew
 7533 Boat and cable ferry operators and related occupations
 7534 Air transport ramp attendants
 7535 Other automotive mechanical installers and servicers
 7611 Construction trades helpers and labourers
 7612 Other trades helpers and labourers
 7621 Public works and maintenance labourers
 7622 Railway and motor transport labourers
 8411 Underground mine service and support workers
 8412 Oil and gas well drilling and related workers and services operators
 8421 Chain saw and skidder operators
 8422 Silviculture and forestry workers
 8431 General farm workers
 8432 Nursery and greenhouse workers
 8441 Fishing vessel deckhands
 8442 Trappers and hunters
 8611 Harvesting labourers
 8612 Landscaping and grounds maintenance labourers
 8613 Aquaculture and marine harvest labourers
 8614 Mine labourers
 8615 Oil and gas drilling, servicing and related labourers
 8616 Logging and forestry labourers
 9411 Machine operators, mineral and metal processing
 9412 Foundry workers

9413 Glass forming and finishing machine operators and glass cutters
9414 Concrete, clay and stone forming operators
9415 Inspectors and testers, mineral and metal processing
9416 Metalworking and forging machine operators
9417 Machining tool operators
9418 Other metal products machine operators
9421 Chemical plant machine operators
9422 Plastics processing machine operators
9423 Rubber processing machine operators and related workers
9431 Sawmill machine operators
9432 Pulp mill machine operators
9433 Papermaking and finishing machine operators
9434 Other wood processing machine operators
9435 Paper converting machine operators
9436 Lumber graders and other wood processing inspectors and graders
9437 Woodworking machine operators
9441 Textile fibre and yarn, hide and pelt processing machine operators and workers
9442 Weavers, knitters and other fabric making occupations
9445 Fabric, fur and leather cutters
9446 Industrial sewing machine operators
9447 Inspectors and graders, textile, fabric, fur and leather products manufacturing
9461 Process control and machine operators, food and beverage processing
9462 Industrial butchers and meat cutters, poultry preparers and related workers
9463 Fish and seafood plant workers
9465 Testers and graders, food and beverage processing
9471 Plateless printing equipment operators
9472 Camera, platemaking and other prepress occupations
9473 Binding and finishing machine operators
9474 Photographic and film processors
9521 Aircraft assemblers and aircraft assembly inspectors
9522 Motor vehicle assemblers, inspectors and testers
9523 Electronics assemblers, fabricators, inspectors and testers
9524 Assemblers and inspectors, electrical appliance, apparatus and equipment manufacturing
9525 Assemblers, fabricators and inspectors, industrial electrical motors and transformers
9526 Mechanical assemblers and inspectors
9527 Machine operators and inspectors, electrical apparatus manufacturing
9531 Boat assemblers and inspectors
9532 Furniture and fixture assemblers and inspectors
9533 Other wood products assemblers and inspectors
9534 Furniture finishers and refinishers
9535 Plastic products assemblers, finishers and inspectors
9536 Industrial painters, coaters and metal finishing process operators
9537 Other products assemblers, finishers and inspectors
9611 Labourers in mineral and metal processing
9612 Labourers in metal fabrication
9613 Labourers in chemical products processing and utilities
9614 Labourers in wood, pulp and paper processing
9615 Labourers in rubber and plastic products manufacturing
9616 Labourers in textile processing
9617 Labourers in food and beverage processing
9618 Labourers in fish and seafood processing
9619 Other labourers in processing, manufacturing and utilities



Servers

3411 Dental assistants
 3413 Nurse aides, orderlies and patient service associates
 3414 Other assisting occupations in support of health services
 4411 Home child care providers
 4412 Home support workers, housekeepers and related occupations
 4413 Elementary and secondary school teacher assistants
 6311 Food service supervisors
 6312 Executive housekeepers
 6313 Accommodation, travel, tourism and related services supervisors
 6314 Customer and information services supervisors
 6315 Cleaning supervisors
 6316 Other services supervisors
 6321 Chefs
 6322 Cooks
 6331 Butchers, meat cutters and fishmongers - retail and wholesale
 6332 Bakers
 6341 Hairstylists and barbers
 6342 Tailors, dressmakers, furriers and milliners
 6343 Shoe repairers and shoemakers
 6344 Jewellers, jewellery and watch repairers and related occupations
 6345 Upholsterers
 6346 Funeral directors and embalmers
 6511 Maîtres d'hôtel and hosts/hostesses
 6512 Bartenders
 6513 Food and beverage servers
 6521 Travel counsellors
 6522 Purser and flight attendants
 6523 Airline ticket and service agents
 6524 Ground and water transport ticket agents, cargo service representatives and related clerks
 6525 Hotel front desk clerks
 6531 Tour and travel guides
 6532 Outdoor sport and recreational guides
 6533 Casino occupations
 6541 Security guards and related security service occupations
 6551 Customer services representatives - financial institutions
 6552 Other customer and information services representatives
 6561 Image, social and other personal consultants
 6562 Estheticians, electrologists and related occupations
 6563 Pet groomers and animal care workers
 6564 Other personal service occupations
 6611 Cashiers
 6621 Service station attendants
 6622 Store shelf stockers, clerks and order fillers
 6623 Other sales related occupations
 6711 Food counter attendants, kitchen helpers and related support occupations
 6721 Support occupations in accommodation, travel and facilities set-up services
 6722 Operators and attendants in amusement, recreation and sport
 6731 Light duty cleaners
 6732 Specialized cleaners
 6733 Janitors, caretakers and building superintendents
 6741 Dry cleaning, laundry and related occupations
 6742 Other service support occupations, n.e.c.

APPENDIX B: OCCUPATIONAL CLUSTERS FOR EACH YORK REGION MUNICIPALITY

The following two tables provide data regarding occupational clusters at the municipality level in York Region. Rather than show the percentage distribution by occupational cluster within each municipality, the figures show the percentage distribution for each of the occupational clusters across all municipalities, that is, for each occupational cluster in York Region, what is its distribution across each of the municipalities.

Table A shows the distribution for employed residents. The top row highlights the percentage distribution of all employed residents by municipality. For example, Vaughan and Markham are each home to 28% of all of York Region's employed residents. The rows which follow show the distribution of employed residents for each occupational cluster across the municipalities. For example, Vaughan is home to 17% of all York Region residents employed in the Artists cluster, whereas Markham is home to 15% of York Region residents employed in the Artists cluster.

Table A: Percentage distribution of employed residents in each occupational cluster across York Region municipalities, 2016

	Vaughan	Markham	Richmond Hill	Whitchurch-Stouffville	Aurora	Newmarket	King	East Gwillimbury	Georgina
ALL OCCUPATIONS	28%	28%	17%	4%	5%	8%	2%	2%	4%
Rulemakers	28%	30%	19%	4%	6%	7%	3%	2%	2%
Sustainers	30%	26%	19%	5%	6%	8%	2%	2%	3%
Calculators	25%	34%	23%	3%	5%	6%	1%	1%	2%
Artists	17%	15%	10%	7%	9%	17%	3%	8%	13%
Administrators	24%	29%	23%	4%	5%	8%	2%	3%	3%
Supporters	28%	27%	18%	5%	6%	7%	3%	2%	4%
Technologists	28%	27%	19%	4%	4%	8%	2%	2%	5%
Artisans	27%	29%	19%	4%	5%	8%	2%	2%	5%
Protectors	27%	27%	18%	5%	6%	9%	2%	3%	4%
Makers	32%	19%	13%	5%	5%	9%	4%	4%	9%
Labourers	29%	28%	13%	4%	5%	9%	2%	3%	7%
Clericals	29%	29%	17%	4%	5%	7%	2%	2%	4%
Servers	27%	31%	15%	4%	5%	9%	2%	2%	5%
Sales	32%	26%	16%	3%	6%	9%	2%	2%	4%

Table B provides the same illustration for the distribution of jobs by occupational clusters across all municipalities.

The cells in Tables A and B are colour-coded to highlight percentages much higher (yellow) or much lower (turquoise) than the figure for all employed residents living in that municipality. For example, in Table A, the 17% share of all York Region Artists living in Vaughan is a much smaller share of the 28% of all York Region employed residents living in Vaughan. The distribution of highlighted cells in Table A suggests there are only a few occupational clusters which see greater percentage variation across the municipalities. There is a high degree of variation among Artists especially, and then to a certain extent among Makers and Calculators, and isolated variations among four other clusters.

There is more variation when the distribution of jobs is profiled in Table B. Certain municipalities stand out in terms of the concentration of jobs within certain clusters. Thus, Vaughan is home to over half (53%) of York Region jobs employing Makers and Labourers, a much higher proportion than the share of all York Region jobs located in Vaughan (36%). On the other hand, Vaughan is home to a smaller share of jobs among Sustainers, Calculators, Artists, Administrators and Technologists.

Table B: Percentage distribution of jobs in each occupational cluster across York Region municipalities, 2016

	Vaughan	Markham	Richmond Hill	Whitchurch-Stouffville	Aurora	Newmarket	King	East Gwillimbury	Georgina
ALL OCCUPATIONS	36%	30%	14%	3%	5%	8%	2%	2%	2%
Rulemakers	30%	38%	15%	2%	5%	7%	1%	1%	1%
Sustainers	24%	27%	19%	3%	7%	14%	2%	1%	2%
Calculators	24%	48%	14%	2%	4%	6%	1%	1%	1%
Artists	20%	14%	12%	3%	26%	21%	0%	1%	5%
Administrators	25%	32%	23%	3%	4%	8%	2%	2%	2%
Supporters	35%	31%	14%	3%	5%	7%	2%	1%	2%
Technologists	27%	25%	18%	3%	7%	13%	2%	2%	3%
Artisans	35%	37%	12%	2%	4%	7%	1%	1%	1%
Protectors	32%	31%	17%	3%	5%	8%	2%	2%	2%
Makers	53%	19%	8%	4%	4%	7%	2%	2%	1%
Labourers	53%	20%	8%	3%	4%	7%	2%	2%	1%
Clericals	33%	32%	14%	2%	6%	9%	1%	1%	2%
Servers	33%	28%	15%	3%	6%	9%	2%	2%	3%
Sales	40%	25%	12%	2%	5%	12%	1%	2%	2%

Both Markham and Richmond Hill have disproportionately smaller shares of jobs among Makers and Labourers, but their high proportion shares are different: Markham has a higher share of Rulemakers, Calculators and Artisans, while Richmond Hill has a higher share of the jobs among Sustainers, Administrators and Technologists.

APPENDIX C: ESTIMATE OF POTENTIAL FOR REMOTE WORK

For each of the following occupational categories which make up an occupational cluster, an estimate is provided for the potential for work to be done from home.

The report from Jonathan I. Dingel and Brent Neiman, "How Many Jobs Can be Done at Home?", proposed that an occupation cannot be performed at home if it meets at least one of several criteria, such as the need to perform for or work directly with the public; to work outdoors; to operate or repair machinery and equipment; to inspect equipment, structures or materials; to wear common or specialized protective or safety equipment; to handle or move objects; or perform general physical activities.

OCCUPATIONAL CLUSTER	
Rulemakers	
00 Senior management occupations	75%
01-05 Specialized middle management occupations	65%
11 Professional occupations in business and finance	85%
411 Judges, lawyers and Quebec notaries	85%
Sustainers	
30 Professional occupations in nursing	2%
31 Professional occupations in health (except nursing)	4%
40 Professional occupations in education services	5%
415 Social and community service professionals	40%
Calculators	
21 Professional occupations in natural and applied sciences	75%
416 Policy and program researchers, consultants and officers	90%
Artists	
51 Professional occupations in art and culture	50%
Administrators	
06 Middle management occupations in retail/wholesale trade & customer services	20%
07-09 Middle management occupations in trades, transportation, production & utilities	5%
12 Administrative and financial supervisors and administrative occupations	65%
13 Finance, insurance and related business administrative occupations	85%
622 Technical sales specialists in wholesale trade and retail and wholesale buyers	85%
623 Insurance, real estate and financial sales occupations	95%
641 Sales and account representatives - wholesale trade (non-technical)	60%
Supporters	
32 Technical occupations in health	4%
42 Paraprofessional occupations in legal, social, community and education services	20%

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Technologists	
22 Technical occupations related to natural and applied sciences	30%
Artisans	
52 Technical occupations in art, culture, recreation and sport	50%
Protectors	
43 Occupations in front-line public protection services	0%
442 Legal and public protection support occupations	0%
Makers	
72 Industrial, electrical and construction trades	0%
73 Maintenance and equipment operation trades	0%
82 Supervisors/technical occupations, natural resources, agriculture & related production	0%
92 Processing, manufacturing and utilities supervisors and central control operators	0%
Labourers	
15 Distribution, tracking and scheduling co-ordination occupations	5%
74 Other installers, repairers and servicers and material handlers	0%
75 Transport and heavy equipment operation and related maintenance occupations	0%
76 Trades helpers, construction labourers and related occupations	0%
84 Workers in natural resources, agriculture and related production	0%
86 Harvesting, landscaping and natural resources labourers	0%
94 Processing and manufacturing machine operators and related production workers	0%
95 Assemblers in manufacturing	0%
96 Labourers in processing, manufacturing and utilities	0%
Clericals	
14 Office support occupations	50%
Servers	
34 Assisting occupations in support of health services	2%
441 Home care providers and educational support occupations	25%
63 Service supervisors and specialized service occupations	5%
65 Service representatives and other customer and personal services occupations	15%
66 Sales support occupations	0%
67 Service support and other service occupations, n.e.c.	0%
Sales	
621 Retail sales supervisors	5%
642 Retail salespersons	15%



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