Manitoba Information and Communication Technology Industry

Labour Market Information Report

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Contents

List of Terms and Acronyms

- GDP = gross domestic product
- MICT = Manitoba Information and Communication Technologies
- CICT = Canada Information and Communication Technologies
- ICT Industry = NAICS 334 + NAICS 5112 + NAICS 517 + NAICS 518 + NAICS 5415
- NAICS = North American Industry Classification System
- NOC = National Occupation Classification System
- CIP = Classification of Instructional Programs Classification System

1.0   Executive Summary and Key Findings

In 2019, the Manitoba Information and Communication Technology (MICT) industry contributed approximately $1.835 billion in gross domestic product (GDP) to the provincial economy – 4.2% of total Manitoba business sector GDP.[1]   It employed 9,300 full-time and part-time workers, approximately 1.4% of total Manitoba employment.

Key Performance Indicator	2019 Manitoba ICT Industry Value	% Share of Provincial Total
Real GDP	$1.835 Billion	4.2% (Share of Business Sector)[2]
Employment	9,300	1.4%
2021 to 2025 Job Openings (MICT *Industry*)	1,220	<1%
2021 to 2025 Job Openings (ICT Workforce – *Occupations*)	2,200	1.5%
Labour Productivity	$69.30 per hour – average of five (5) sectors, $39.60 (low) to $138 (high)	N/A
Capital and Repair Expenditures	Second Last[3] ahead of only Saskatchewan	N/A
Businesses with Employees	602	1.4%
Businesses with 100 or more Employees	11	1.1%
Businesses without Employees	704	< 1.0%

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[1] GDP is measured in 2012 Canadian Dollars throughout this report (real GDP). ICT wholesale and ICT repairs are excluded.

[2] Excludes not-for-profit institutions serving households and government.

[3] See Conference Board of Canada, https://www.conferenceboard.ca/hcp/provincial/innovation/ict.aspx

The following sectors are considered core ICT industries for the purpose of this report:

- ✓ Computer and electronic product manufacturing (NAICS – 334)
- ✓ Software publishers (NAICS – 5112)
- ✓ Telecommunications (NAICS – 517)
- ✓ Data processing, hosting, and related services (NAICS – 518)
- ✓ Computer systems design and related services (NAICS – 5415)
- ✓ Interactive media (<u>Cultural Satellite Account Industry Perspective</u> selected sections only)

The above six (6) sectors are considered the core ICT industry. However, ICT occupations are employed by many businesses not considered part of the core ICT industry (for example, a computer programmer employed by a car manufacturer). This report explains data, trends, and findings with respect to both the core ICT industry and ICT occupations. See Appendix A for a list of the ICT occupations.

Key Findings

- ➢ MICT industry real GDP is large, however accounts for a lower proportion of total provincial business sector GDP than in Canada's ICT (CICT) industry relative to the Canadian business sector total.

- ➢ The 4.2% of total business sector GDP ($1.835 billion), contributed from the MICT industry, is generated from only 1,306 MICT businesses, approximately 1% of total Manitoba businesses.

- ➢ Real GDP of the MICT industry was not severely impacted by COVID-19, 2019 to 2020 period with 0.6% real GDP growth. However, MICT industry grew less than the CICT industry which grew by 1.5% between 2019 and 2020.

- ➢ 75% of MICT GDP is generated by the telecommunications sector and 17% is generated by computer systems design and related services.

- Interactive media (which includes video game development and retail) real GDP in Manitoba grew from $22 million to $26.6 million between 2014 and 2019, or, 3.84% annually. The Canadian industry grew by 2.89% annually.[4]

- The employed MICT labour force is anticipated to decrease for all sectors other than computer systems design and related services (NAICS – 5415) between 2021 and 2025. However, there is anticipated to be significant growth in the ICT workforce employed outside of the core ICT industries (see Appendix A for details).

- Manitoba Interactive media jobs grew from 340 to 408, or 3.71% annually between 2014 and 2019. This compares to 0.7% in the Canadian industry.[5]

- Between 2021 and 2025, there will be 2,200 job openings in the MICT workforce occupations. 650 are due to expanding and new businesses (expansion demand), 1,500 are due to retiring workers (replacement demand). Almost all expansion demand is the result of *computer systems design and related services* sector.

- Information systems analysts and consultants, Computer programmers and interactive media developers, Technical sales specialists - wholesale trade, Other customer and information services representatives, and Computer network technicians are expected to yield the most job openings between 2021 and 2025.

- Section 6.0 presents a list of skills and other attributes anticipated to be required of the MICT workforce between 2021 and 2025.

- The MICT workforce is concentrated primarily in the Winnipeg Economic Region.

- Approximately 32% of the MICT workforce is female, with approximately 240 females aged 15-24 employed in the industry each year.

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[4] See Cultural Satellite Account, industry perspective, Interactive Media category.
[5] See Cultural Satellite Account, industry perspective, Interactive Media category.

- ➢ Job vacancies lasting 90+ days are increasing in the CICT industry indicative of growing labour shortages within the industry. In Manitoba, approximately 200 ICT jobs are estimated to go unfilled annually between 2021 and 2025.

- ➢ Manitoba underinvests in ICT related goods and services relative to the rest of the world, and the other Canadian provinces according to the Conference Board of Canada. Only Saskatchewan invests less in ICT relatively.

- ➢ Labour productivity in the MICT industry is lower than the CICT industry on average.

- ➢ MICT businesses tend to be small, with 94% having 0-19 employees.

2.0   Real Gross Domestic Product

Section Highlights

➢ MICT industry real GDP grew slower than CICT industry real GDP between 2010 and 2019.

➢ During COVID-19, 2019 to 2020 period, MICT industry real GDP grew by 0.6% compared to 1.5% in CICT industry.

➢ MICT industry real GDP accounts for 4.2% of Manitoba business sector total GDP, compared to 6.0% in Canada.

➢ Interactive media (which includes video game development and retail) real GDP in Manitoba grew from $22 million to $26.6 million between 2014 and 2019, or, 3.84% annually. The Canadian industry grew by 2.89% annually.

In 2019, MICT industry real GDP was $1.835 billion, approximately 4.2% of total Manitoba business sector real GDP. The CICT industry real GDP in 2019 was $89.25 billion, approximately 6% of total Canadian business sector real GDP.

Between 2010 and 2019, the ICT industry and overall business sectors in Manitoba and Canada grew as follows:

Real GDP Industry Growth	2010 to 2019 Annualized Growth	COVID Period 2019 to 2020 - 1 Year Growth Rate
Manitoba ICT	1.7%	0.6%
Canada ICT	3.3%	1.5%
Manitoba Overall Business Sector Industries	2.1%	-6.2%
Canada Overall Business Sector Industries	2.4%	-6.6%

Source: Statistics Canada. Table 36-10-0480-01 Labour productivity and related measures by business sector industry and by non-commercial activity consistent with the industry accounts

Over the 2010 to 2019 period, real GDP in the MICT industry grew slower than Canada's ICT industry at 1.7% annually, compared to 3.3%. During this period Canada's ICT industry outperformed Manitoba's in all sectors except for Data processing, hosting, and related services (8.2% compared to 4.8% annual growth) and Telecommunications where they were the same (2.1%).

With respect to overall industry performance (real GDP), CICT industry has outperformed MICT industry with regards to real GDP growth, and, the share of business sector GDP generated by the ICT industry. This could be a result of lower Manitoba business and other sectoral investment in ICT related goods and services compared to other provinces as explained in Section 8.0.

Both MICT and CICT industries realized real GDP gains between 2019 and 2020 (0.6% and 1.5% respectively), unlike many industries that were negatively impacted by COVID-19.
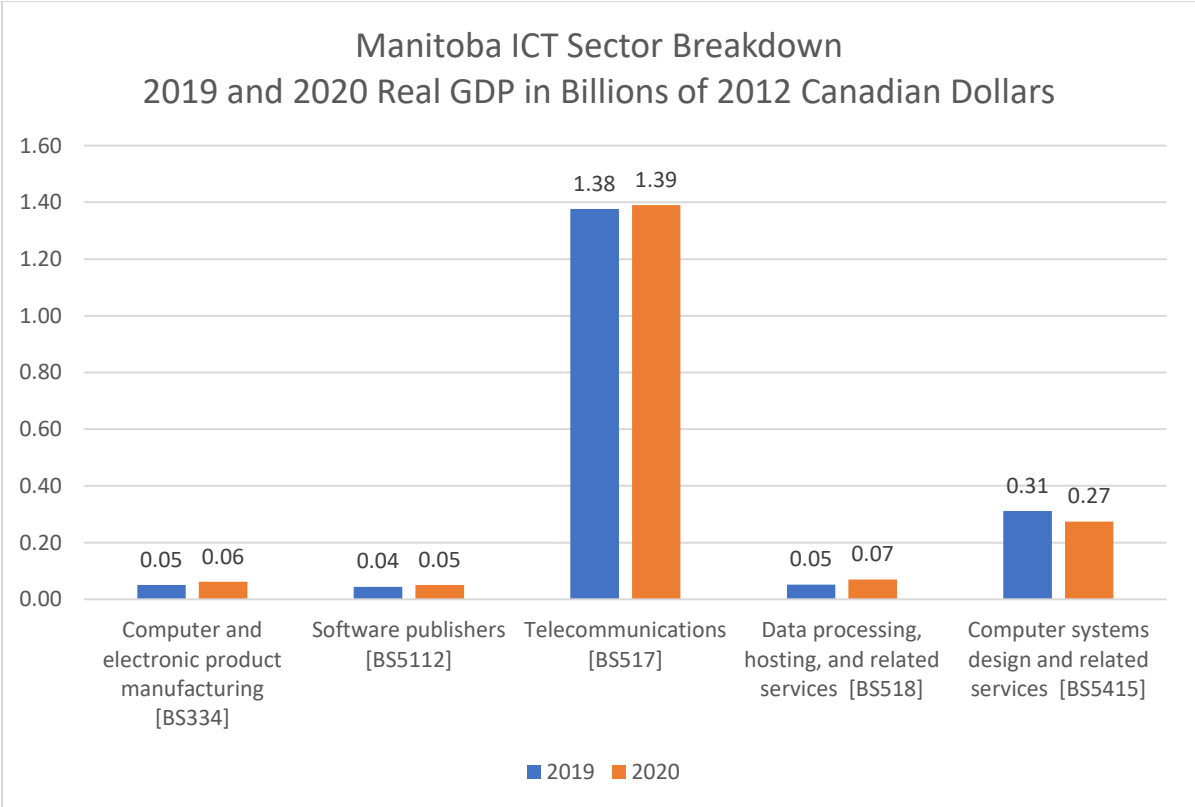
Manitoba ICT Sector Breakdown

Source: Statistics Canada. Table 36-10-0480-01 Labour productivity and related measures by business sector industry and by non-commercial activity consistent with the industry accounts

It is important to note that while computer systems design and related services real GDP decreased between 2019 and 2020, the employed labour force increased significantly. Interactive media (which includes video game development and

retail) real GDP in Manitoba grew from $22 million to $26.6 million between 2014 and 2019, or, 3.84% annually. The Canadian industry grew by 2.89% annually.[6]

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[6] See Cultural Satellite Account, industry perspective, Interactive Media category.

3.0   Industry Labour Demand Forecast

It is estimated that between 2021 and 2025, no **new** jobs will be created in the MICT industry. This is due to an economic contraction in three (3) out of the five (5) core MICT sectors. However, the main ICT sector, *computer systems design and related services* is anticipated to see employment growth of approximately 1,000 jobs between 2021 and 2025. The following table presents the actual and forecasted employed workforce, 2010 to 2025, by core MICT sector:

Year	Total	334 Computer and electronic product manufacturing	5112 Software publishers	517 Telecommunications	518 Data processing, hosting, and related services	5415 Computer systems design and related services
2010	9,860	810	320	4,450	0	4,280
2011	9,210	860	380	4,970	0	3,000
2012	11,200	840	350	5,280	0	4,730
2013	10,910	950	350	4,870	0	4,740
2014	10,960	600	250	4,390	0	5,720
2015	9,350	810	230	4,780	0	3,530
2016	10,290	1,150	210	4,500	0	4,430
2017	10,900	1,400	190	3,930	0	5,380
2018	10,320	1,560	190	3,550	0	5,020
2019	9,370	1,060	270	3,450	0	4,590
2020	10,700	1,020	180	3,760	0	5,740
2021	9,940	890	190	3,540	0	5,320
2022	9,520	800	160	3,190	0	5,370
2023	9,970	800	140	3,210	0	5,820
2024	10,330	700	130	3,230	0	6,270
2025	10,680	600	110	3,250	0	6,720

Source: WEM LMI Forecasting Model

The blue-coloured cells represent actuals while the green represent forecast. Between 2010 and 2019, the industry shrunk from approximately 9,860 to 9,370 employed workers, with 2020 resulting in a 1,330 employed worker increase during the COVID-19 period, primarily due to significant gains in sector NAICS – 5415.

Aside from the minimal expansion demand, there will be an additional 1,260 job openings to replace retiring workers.   The following table presents the MICT industry job openings, 2021 to 2025, by expansion, replacement, and net job demand:

Industry NAICS	334 Computer and electronic product manufacturing			5112 Software publishers			517 Telecommunications			518 Data processing, hosting, and related services			5415 Computer systems design and related services			Total		
Years	Expansion Demand	Replacement Demand	Total Net Job Demand	Expansion Demand	Replacement Demand	Total Net Job Demand	Expansion Demand	Replacement Demand	Total Net Job Demand	Expansion Demand	Replacement Demand	Total Net Job Demand	Expansion Demand	Replacement Demand	Total Net Job Demand	Expansion Demand	Replacement Demand	Total Net Job Demand
2021	-130	20	-110	0	10	10	-220	110	-110	0	0	0	-430	100	-330	-780	240	-540
2022	-90	20	-70	-20	10	-10	-350	110	-240	0	10	10	50	100	150	-410	250	-160
2023	0	20	20	-20	10	-10	20	120	140	0	10	10	450	100	550	450	250	700
2024	-100	20	-80	-20	10	-10	20	120	140	0	10	10	450	110	560	350	260	610
2025	-100	20	-80	-20	10	-10	20	120	140	0	10	10	450	110	560	350	270	620
Total	-420	100	-320	-80	30	-50	-510	580	70	0	30	30	970	520	1,490	-40	1,260	1,220

Source: WEM LMI Forecasting Model

2021 and 2022 are projected to result in an overall industry contraction as the economy recovers from COVID-19, relying less on ICT related services. 2023 to 2025 are estimated to result in 2,000 job openings in total, between 600 and 700 each year.

Total MICT Industry Job Openings 2021 to 2025:

Expansion	Replacement	Net	% of Total Manitoba Job Openings
-40	1,260	1,220	<1%

Source: WEM LMI Forecasting Model

See Appendix A for the job openings, by 4-digit NOC. These are job openings for ICT related occupations across ALL sectors of the Manitoba economy.

Between 2021 and 2025, a total of 1,220 jobs will open in the MICT industry. The following table presents the top 20 MICT Occupations with respect to total (net) job openings between 2021 and 2025 (see Appendix A for detailed occupations employed across ALL Manitoba industries):

| NOC	Title	Net Job Openings 2021 to 2025 (Expansion + Replacement = Net)
2171	Information systems analysts and consultants	199
2174	Computer programmers and interactive media developers	147
6221	Technical sales specialists - wholesale trade	122
6552	Other customer and information services representatives	96
2242	Electronic service technicians (household and business equipment)	92
2281	Computer network technicians	88
6421	Retail salespersons	80
2282	User support technicians	76
213	Computer and information systems managers	68
2173	Software engineers and designers	56
2175	Web designers and developers	45
7246	Telecommunications installation and repair workers	36
1411	General office support workers	36
1221	Administrative officers	31
1241	Administrative assistants	27
1122	Professional occupations in business management consulting	27
2147	Computer engineers (except software engineers and designers)	26
13	Senior managers - financial, communications and other business services	21
1525	Dispatchers	21
621	Retail and wholesale trade managers	19

Source: WEM LMI Forecasting Model

4.0   Regional Employment
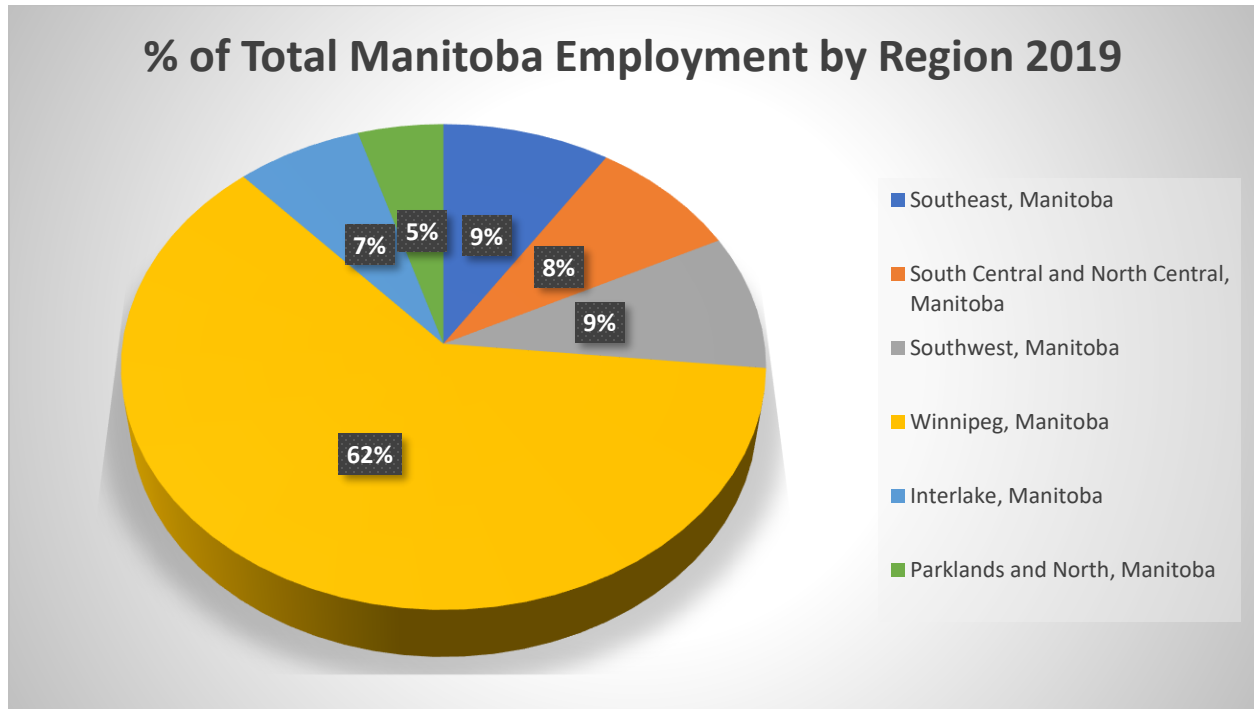
Section Highlights

- ➢ 79% of MICT workforce is in Winnipeg.
- ➢ The Manitoba MICT labour force has approximately six (6) times as many individuals with degrees from CIP 11 - Computer and information sciences and support services than from CIP 10 - Communications technologies/technicians and support services.

Unlike other WEM LMI SCP Reports, this section uses the Classification of Instructional Programs (CIP) to define the MICT industry rather than the North American Industry Classification System (NAICS). CIP 10 - Communications technologies/technicians and support services and 11 - Computer and information sciences and support services are considered the core MICT education categories comprising the industry.   The following table presents the percentage (%) of Manitoba ICT employment by economic region, using the two (2) CIP categories described above:
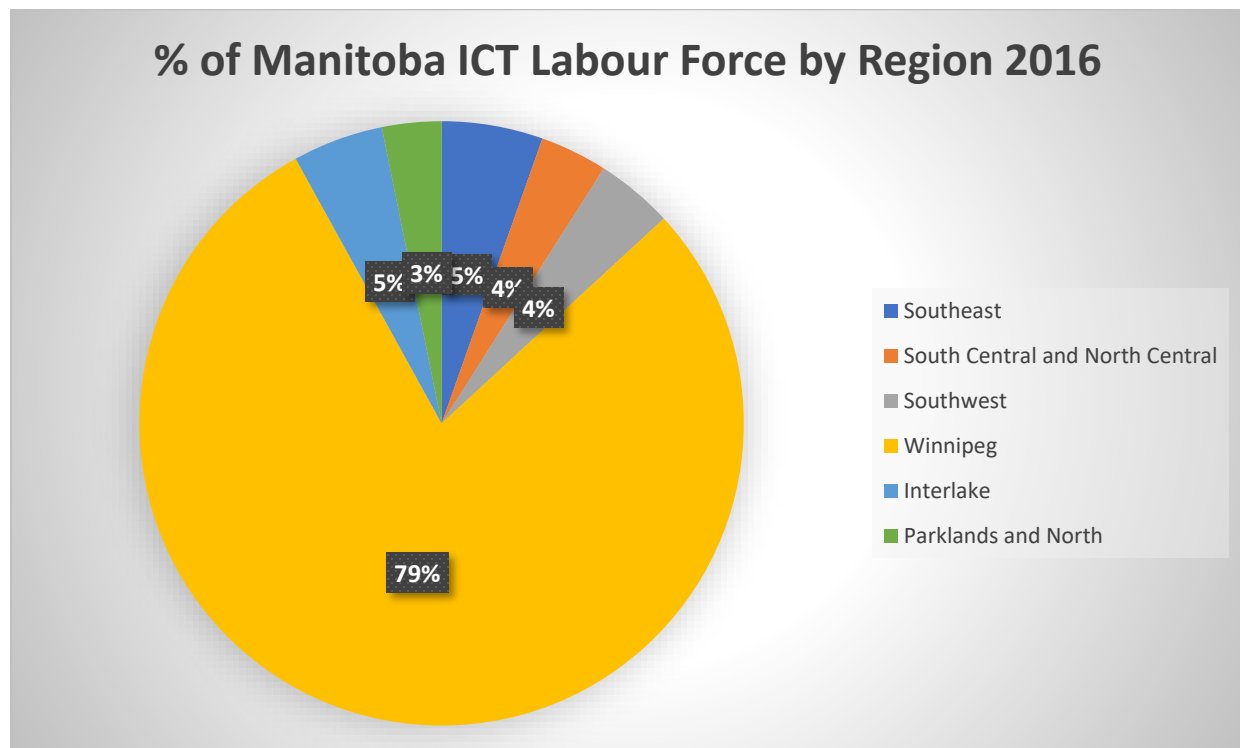
Source: Statistics Canada. Table 14-10-0092-01 Employment by industry, annual, provinces and economic regions, inactive (x 1,000)

==Winnipeg region accounts for 79% of MICT employment, followed by Southeast and Interlake with 5%. This data will be updated in 2022.==

% of Total Manitoba Employment by Region 2019

Legend:
- Southeast, Manitoba
- South Central and North Central, Manitoba
- Southwest, Manitoba
- Winnipeg, Manitoba
- Interlake, Manitoba
- Parklands and North, Manitoba

Values shown: 9%, 8%, 9%, 62%, 7%, 5%

Source: Statistics Canada. Table 14-10-0092-01 Employment by industry, annual, provinces and economic regions, inactive (x 1,000)

As shown in the pie chart above, total Manitoba employment is concentrated in Winnipeg less than MICT employment.

Total ICT Labour Force (employed + unemployed)	10. Communications technologies/technicians and support services	11. Computer and information sciences and support services
Southeast	130	825
South Central and North Central	160	475
Southwest	170	560
Winnipeg	1,670	12,235
Interlake	200	655
Parklands and North	80	480
Total	2,410	15,230

5.0   Industry Demographics

Section Highlights

- ➢ Approximately 32% of the MICT workforce is female compared to 30% of the CICT workforce (2016 figure).
- ➢ Approximately 240 females, age 15-24 are employed in the MICT industry each year, approximately 7% of total MICT females (2016 figure).
- ➢ Approximately 8% of the MICT workforce identifies as Indigenous compared to 1.5% of the CICT workforce (2016 figure).
- ➢ MICT industry employs slightly more international immigrants than Canada's industry with 6.6% compared to 6.0% (2016 figure).
- ➢ 7.4% of the MICT workforce is comprised of individuals age 15-24 compared to 15% in the overall Manitoba workforce (2016 figure).

The MICT workforce is predominantly male. The following table shows the number of individuals employed, by MICT sector, by gender (2016):

Manitoba ICT Sector	Male	Female	Total	% Female
334 Computer and electronic product manufacturing	545	265	810	33%
5112 Software publishers	195	65	255	25%
517 Telecommunications	3,100	1,855	4,955	37%
518 Data processing, hosting, and related services	115	65	180	36%
5415 Computer systems design and related services	3,155	1,095	4,250	26%
Total	**7,110**	**3,345**	**10,450**	**32%**

Canada ICT Sector	Male	Female	Total	% Female
334 Computer and electronic product manufacturing	41,225	20,510	61,735	33%
5112 Software publishers	25,230	9,410	34,640	27%
517 Telecommunications	97,520	50,790	148,310	34%
518 Data processing, hosting, and related services	8,430	5,350	13,780	39%
5415 Computer systems design and related services	202,400	72,175	274,575	26%
Total	**374,805**	**158,235**	**533,040**	**30%**

There are slightly more females employed in the MICT industry than CICT (proportionally) due to large levels of female employment in telecommunications.

Overall, the MICT workforce accounts for approximately 1.4% of total Manitoba employment.

Indigenous Employment

According to data collected and analyzed from the 2016 Census Program, approximately 8% of the MICT workforce identifies as Indigenous, compared to only 1.5% Canada wide. These figures will be compared to the upcoming 2021 Census Release.

Immigration Employment

According to data collected and analyzed from the 2016 Census Program, approximately 6.6% of the MICT workforce immigrated to Manitoba internationally compared to 6.0% Canada wide. These figures will be compared to the upcoming 2021 Census Release.

Age

In 2016, of the 10,450 individuals employed in ICT, 775 were between 15 and 24 years of age, approximately 7.4% of the MICT workforce. This compares to 15% for the overall Manitoba workforce. This is likely due to the educational requirements of ICT jobs relative to the average.

6.0   Worker Skills and Attribute Forecast

This section presents the forecasted skills and worker attribute requirements necessary for employment in core ICT jobs between 2021 and 2025. Core ICT jobs are defined as any job where at least 50% of the employed workforce is employed in MICT industry sectors.

Skills

#	Name	Value
1	**Monitoring** Monitoring/Assessing performance of yourself, other individuals, or organizations to make improvements or take corrective action.	560
2	**Critical Thinking** Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems.	557
3	**Management of Personnel Resources** Motivating, developing, and directing people as they work, identifying the best people for the job.	549
4	**Active Listening** Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times.	527
5	**Speaking** Talking to others to convey information effectively.	522
6	**Coordination** Adjusting actions in relation to others' actions.	517
7	**Reading Comprehension** Understanding written sentences and paragraphs in work related documents.	515
8	**Judgment and Decision Making** Considering the relative costs and benefits of potential actions to choose the most appropriate one.	510
9	**Complex Problem Solving** Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions.	504

#	Name	Value
10	**Time Management** Managing one's own time and the time of others.	502

Abilities

#	Name	Value
1	**Oral Comprehension** The ability to listen to and understand information and ideas presented through spoken words and sentences.	566
2	**Oral Expression** The ability to communicate information and ideas in speaking so others will understand.	566
3	**Written Comprehension** The ability to read and understand information and ideas presented in writing.	565
4	**Problem Sensitivity** The ability to tell when something is wrong or is likely to go wrong. It does not involve solving the problem, only recognizing there is a problem.	553
5	**Near Vision** The ability to see details at close range (within a few feet of the observer).	543
6	**Deductive Reasoning** The ability to apply general rules to specific problems to produce answers that make sense.	540
7	**Inductive Reasoning** The ability to combine pieces of information to form general rules or conclusions (includes finding a relationship among seemingly unrelated events).	540
8	**Speech Clarity** The ability to speak clearly so others can understand you.	524
9	**Information Ordering** The ability to arrange things or actions in a certain order or pattern according to a specific rule or set of rules (e.g., patterns of numbers, letters, words, pictures, mathematical operations).	517

#	Name	Value
10	**Speech Recognition** The ability to identify and understand the speech of another person.	515

Knowledge

#	Name	Value
1	**Computers and Electronics** Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.	631
2	**Customer and Personal Service** Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.	604
3	**Telecommunications** Knowledge of transmission, broadcasting, switching, control, and operation of telecommunications systems.	569
4	**Administration and Management** Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.	548
5	**Engineering and Technology** Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.	536
6	**English Language** Knowledge of the structure and content of the English language including the meaning and spelling of words, rules of composition, and grammar.	530
7	**Personnel and Human Resources** Knowledge of principles and procedures for personnel recruitment, selection, training, compensation and benefits, labor relations and negotiation, and personnel information systems.	493

#	Name	Value
8	**Mechanical** Knowledge of machines and tools, including their designs, uses, repair, and maintenance.	487
9	**Education and Training** Knowledge of principles and methods for curriculum and training design, teaching and instruction for individuals and groups, and the measurement of training effects.	485
10	**Mathematics** Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.	483

Work Styles

#	Name	Value
1	**Attention to Detail** Job requires being careful about detail and thorough in completing work tasks.	658
2	**Dependability** Job requires being reliable, responsible, and dependable, and fulfilling obligations.	655
3	**Integrity** Job requires being honest and ethical.	638
4	**Leadership** Job requires a willingness to lead, take charge, and offer opinions and direction.	629
5	**Stress Tolerance** Job requires accepting criticism and dealing calmly and effectively with high stress situations.	628
6	**Cooperation** Job requires being pleasant with others on the job and displaying a good-natured, cooperative attitude.	620
7	**Self Control** Job requires maintaining composure, keeping emotions in check, controlling anger, and avoiding aggressive behavior, even in very difficult situations.	617

#	Name	Value
8	**Analytical Thinking** Job requires analyzing information and using logic to address work-related issues and problems.	605
9	**Initiative** Job requires a willingness to take on responsibilities and challenges.	605
10	**Adaptability/Flexibility** Job requires being open to change (positive or negative) and to considerable variety in the workplace.	599

Work Activities

#	Name	Value
1	**Getting Information** Observing, receiving, and otherwise obtaining information from all relevant sources.	624
2	**Making Decisions and Solving Problems** Analyzing information and evaluating results to choose the best solution and solve problems.	624
3	**Interacting With Computers** Using computers and computer systems (including hardware and software) to program, write software, set up functions, enter data, or process information.	614
4	**Updating and Using Relevant Knowledge** Keeping up-to-date technically and applying new knowledge to your job.	606
5	**Communicating with Supervisors, Peers, or Subordinates** Providing information to supervisors, co-workers, and subordinates by telephone, in written form, e-mail, or in person.	602
6	**Identifying Objects, Actions, and Events** Identifying information by categorizing, estimating, recognizing differences or similarities, and detecting changes in circumstances or events.	596
7	**Organizing, Planning, and Prioritizing Work** Developing specific goals and plans to prioritize, organize, and accomplish your work.	582

#	Name	Value
8	**Monitor Processes, Materials, or Surroundings** Monitoring and reviewing information from materials, events, or the environment, to detect or assess problems.	581
9	**Inspecting Equipment, Structures, or Material** Inspecting equipment, structures, or materials to identify the cause of errors or other problems or defects.	578
10	**Coordinating the Work and Activities of Others** Getting members of a group to work together to accomplish tasks.	562

The value column is generated using an index of job openings and workforce attributes and is used to rank importance. Labour market planners should consider the above attributes when reviewing the existing curriculum and training plans.

7.0   Job Vacancies and Labour Shortages

Section Highlights

➢ CICT job vacancies lasting 90+ days are increasing, indicative of labour shortages within the industry.
➢ One (1) core education category employed by the MICT industry is anticipated to yield significant annual labour shortages between 2021 and 2025.

WEM LMI estimates that annually, between 2021 and 2025, **177 jobs** requiring education in CIP - 11. Computer and information sciences and support services and **14 jobs** requiring CIP - 10. Communications technologies/technicians and support services will go unfilled in Manitoba (job vacancies). This is approximately 200 unfilled MICT jobs per year.

Job Vacancies are the number of unfilled positions, within a given time-frame, for an occupation or industry. To determine unfilled positions due to a shortage of labour, the vacant for 90+ days category is analyzed. Since this data is only available at the occupation level, two (2) specific 3-digit NOC codes are utilized since they are the primary ICT occupation categories. Note that this data is for Canada as the Manitoba data is too small to be reliable.

Job Vacancies in Canada ICT Industry (90+ days)	2017	2018	2019	2020	2021Q1
Computer and information systems professionals [NOC-217]	2158	2994	3088	4823	4365
Technical occupations in computer and information systems [NOC-228]	290	583	514	800	675

Source: Statistics Canada. Table 14-10-0328-01 Job vacancies, proportion of job vacancies and average offered hourly wage by selected characteristics, quarterly, unadjusted for seasonality

As shown in the above table, job vacancies lasting 90 days or more in the main ICT occupation categories are increasing significantly. This indicates an increasing shortage of labour within the Canadian ICT industry. The above table also excludes the effects of COVID-19 pandemic as Q2 and Q3 of 2020 are omitted from the dataset. These results align with internal WEM forecasting models that suggest the following shortage of labour between 2021 and 2025 (in Manitoba):

Education Category –	Annual Labour Shortage (Excluding COVID-19 Recovery)
10. Communications technologies/technicians and support services	14
11. Computer and information sciences and support services	177

Source: WEM LMI Forecasting Model

Note that jobs requiring No postsecondary are excluded from the gap analysis above.

8.0   Capital and Repair Expenditures

Each year, businesses and organizations expend funds on new and the repair of buildings, equipment and machines. This section typically relies on data from Statistics Canada. Table 34-10-0035-01 Capital and repair expenditures, non-residential tangible assets, by industry and geography (x 1,000,000), to analyze the amount of funds expended by the industry on new and repair of capital. Since however, ICT is integrated within almost all industries, this section will investigate Manitoba's decisions regarding the implementation of ICT. According to the Conference Board of Canada,

"ICT investment is measured as a share of GDP in order to assess the level of investment of each comparator region relative to the size of its economy.

ICT investment includes investment in:

- ✓ software (including pre-packaged software, customized software, and software developed in-house)
- ✓ IT equipment (computers and related hardware)
- ✓ communications equipment

How do the provinces rank relative to international peers?

Most provinces fare poorly relative to international peers on ICT investment. Ontario, New Brunswick, and Alberta are the top-performing provinces but score only C grades and trail 10 of 16 international peers. Most of the remaining provinces receive D grades, while Saskatchewan gets a D–.

Ontario has ICT investment of 2.39 per cent of GDP, earning 11th place, and well behind leading countries, Switzerland (3.83 per cent), Sweden (3.43 per cent), and Japan (3.4 per cent). With ICT investment of 2.37 per cent of GDP, New Brunswick manages to rank in the top half—in 12th place. Alberta claims 13th with ICT investment of 2.29 per cent of GDP.

Canada barely manages to get a C with ICT investment of 2.16 per cent of GDP, while all other provinces receive D or D– grades, with ICT investment ranging from 2.04 per cent in Quebec to 1.49 per cent in Saskatchewan. Among international peers, only Finland (1.84 per cent), Germany (1.72 per cent), and Ireland (1.51 per cent) perform worse than Canada on this indicator.

How do the provinces rank relative to each other?

Ontario, New Brunswick, and Alberta are the highest-ranked provinces and the only C performers on ICT investment, while Saskatchewan is the lowest-ranking province and receives a D– grade for falling behind the lowest-ranked country, Ireland. ICT investment in Saskatchewan (1.49 per cent) is nearly a full percentage point lower than it is in Ontario (2.39 per cent).

The performance of the remaining six provinces, all of which earn D grades, is relatively similar, with ICT investment in Quebec at 2.04 per cent of GDP and in Manitoba at 1.69 per cent."
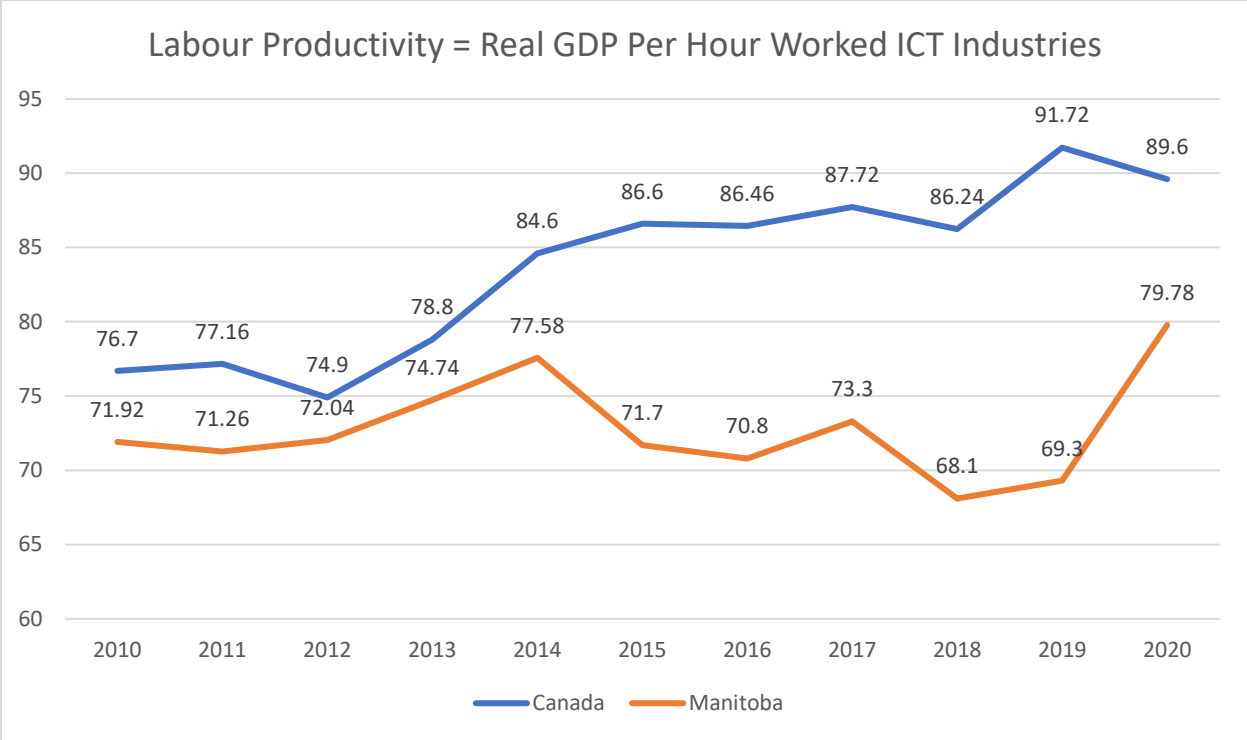
9.0   Labour Productivity

This section measures productivity of the Manitoba and Canadian ICT industries using two measurements of productivity:

(1) Labour productivity – real GDP per hour worked
(2) Multifactor productivity – the efficiency with which all inputs are used in production. It is the ratio of real gross domestic product (GDP) to combined labour and capital inputs.

Labour Productivity

Labour productivity, defined as real GDP per hour worked, in both the Manitoba and Canadian ICT industries are typically higher than the overall business sector as ICT sectors are high value-added – for example, in Manitoba, 4.2% of Manitoba's business sector GDP is from ICT and is generated by a workforce that is only 1.4% of total Manitoba employment. In 2019, real GDP per hour worked (labour productivity) in the MICT industry was $69.30 compared to $53.80 in the overall Manitoba business sector.   When compared to Canada as a whole, labour productivity in the MICT is below Canada's in all years between 2010 and 2020.

Labour Productivity = Real GDP Per Hour Worked ICT Industries

Source: Statistics Canada. Table 36-10-0480-01 Labour productivity and related measures by business sector industry and by non-commercial activity consistent with the industry accounts

Within the ICT industry sectors, Manitoba's labour productivity is below Canada in all.

The difference in labour productivity is reflected in salaries and wages paid to the ICT workforce. The following table presents the average total compensation per hour worked (TCPHW) paid to staff employed in the various ICT sectors:

Sector	Manitoba 2019 Average TCPHW	Canada 2019 Average TCPHW	Difference (MB minus Canada)
Business sector industries	31.9	35.64	-3.74
Computer and electronic product manufacturing [BS334]	81.03	45.11	35.92
Software publishers [BS5112]	41.75	70.33	-28.58
Telecommunications [BS517]	47.84	47.04	0.8

Data processing, hosting, and related services [BS518]	55.51	60.82	-5.31
Computer systems design and related services [BS5415]	37.63	47.22	-9.59

Manitoba's 2019 TCPHW exceeds Canada's in ICT manufacturing by $36.00 per hour. However, 2018 and 2019 were years in which Manitoba had very high TCPHW in that particular sector for reasons unknown. Typically, salaries and wages in Manitoba are lower than the Canadian average.

10.0 Information and Communication Technologies

This section analyzes the types of technologies used by the Canadian Private Sector.

	Canada			
	Private sector			
	Total, all enterprises	Small enterprises	Medium-sized enterprises	Large enterprises
Information and communication technologies (ICT) used	2019	2019	2019	2019
	Percent			
Company-wide computer network	50.7	44.7	74.9	93.7
Industry-specific software	39.9	34.9	60	89.3
Software not specific to this business's industry	45.6	42.2	59.3	72.3
Customer relationship management (CRM) software	16.4	13	28.6	28.1
Electronic data interchange (EDI) on the Internet	11.1	9.1	17.5	14
Enterprise resource planning (ERP) software	5.9	2.7	17.1	36.8
Radio frequency identification (RFID) tags	1.8	1	4.5	21
Cloud computing	38.9	35.3	52.1	85.2
Internet-connected smart devices, or Internet of things (IoT)	22.6	20.6	29.6	58.8
Software and hardware using artificial intelligence (AI)	2.3	1.7	3.5	8.4
Advanced robotics	0.8	0.5	1.9	1.4
Big data analytics	1.8	1.1	3.3	7.2
3D printing	1.7	1.2	3.1	9.9
Blockchain technologies	0.3	0.3	0.4	0
Open-source software	17.2	14.5	27.3	39
Business does not use information and communication technologies (ICT)	19.8	22.3	9.5	0.6

Source: Statistics Canada. Table 22-10-0117-01 Information and communication technologies used by industry and size of enterprises

- *Small enterprises have 0 to 19 full-time employees*
- *Medium-sized enterprises have 20 to 99 full-time employees*
- *Large enterprises have 100 or more full-time employees*

Larger businesses tend to rely on ICT more than SMEs. 19.8% of Canadian businesses do not use ICT while only 0.6% of large Canadian businesses do not use ICT. Overall, computer-wide company network, software specific and not specific to the business's industry are the three (3) most used ICT. For larger businesses, cloud computing becomes heavily used. ERP is another ICT that becomes more frequently used amongst larger businesses.

11.0 Businesses

Section Highlights

➢ In Manitoba, approximately 1% of business are considered ICT compared to 2.5% Canada-wide.

➢ Within the MICT industry, small businesses accounts for 94% of the total, 5.3% medium sized, and 0.8% large sized.

➢ Within the CICT industry, small businesses accounts for 96.2% of the total, 3% medium sized, and 0.7% large sized.

There are an estimated 1,306 businesses in the Manitoba ICT industry, with 704 having no employees. 94% of total Manitoba ICT businesses are small, with 0-19 employees. There are 11 businesses in the Manitoba ICT industry with 100 or more employees. In the CICT industry, 96% of businesses are small, with 0-19 employees, 3% have 20 to 99 employees, and 1% have 100 or more employees. Overall, ICT businesses comprise 1% of total Manitoba businesses. However, these businesses generate 4.2% of Manitoba's GDP.

Manitoba as a start-up environment for ICT businesses

Manitoba appears conducive to ICT business development. The number of businesses with no employees grew between 2015 and 2019 in all five (5) ICT sectors. NAICS 5415, computer systems design and related services grew by 3.3% annually (2015 to 2019), slightly less than in Canada (4.6%). Telecommunications businesses grew by 4.1% annually in Manitoba while declining by 2.3% in Canada.

Overall ICT Business Growth

Between 2015 and 2019, the number of Manitoba telecommunications and computer systems design and related services businesses grew significantly, with the latter growing in all employee size categories. This is consistent in Canada as a whole.

Business Size, Manitoba and Canada Wide, Numbers					
Period	June, 2015				
Industry [NAICS]	Geography	0 to 19 Employees	20 to 99 Employees	100+ Employees	Total, With & Without Employees
Computer and electronic product manufacturing [334]	Canada	2,584	400	130	3,114
	Manitoba	43	7	1	51
Telecommunications [517]	Canada	4,291	456	126	4,873
	Manitoba	82	11	10	103
Data processing, hosting, and related services [518]	Canada	3,289	140	49	3,478
	Manitoba	59	2	1	62
Software publishers [5112]	Canada	2,810	294	92	3,196
	Manitoba	43	4	1	48
Computer systems design and related services [5415]	Canada	74,293	1,410	304	76,007
	Manitoba	814	26	4	844
Source: Cansim, Table 33-10-0031-01					
Source: Cansim Table 33-10-0032-01					
Business Size, Manitoba and Canada Wide, Numbers					
Period	June, 2019				
Industry [NAICS]	Geography	0 to 19 Employees	20 to 99 Employees	100+ Employees	Total, With & Without Employees
Computer and electronic product manufacturing [334]	Canada	2,495	378	128	3,001
	Manitoba	37	7	0	44
Telecommunications [517]	Canada	7,051	541	152	7,744
	Manitoba	178	20	3	201
Data processing, hosting, and related services [518]	Canada	3,066	134	50	3,250
	Manitoba	56	1	1	58
Software publishers [5112]	Canada	2,797	348	101	3,246
	Manitoba	42	4	0	46
Computer systems design and related services [5415]	Canada	88,520	1,798	440	90,758
	Manitoba	913	37	7	957
Source: Cansim, Table 33-10-0214-01					

Appendix A – Detailed Labour Demand by 4-Digit NOC

Labour Demand for ICT Industry Jobs

Manitoba	2021	2021	2021	2022	2022	2022	2023	2023	2023	2024	2024	2024	2025	2025	2025	TOTAL	TOTAL	TOTAL
Net Job Demand by 4-Digit NOC	EXP	REPL	TOT	EXP	REPL	TOT	EXP	REPL	TOT	EXP	REPL	TOT	EXP	REPL	TOT	EXP	REPL	TOT
Total - Occupation	-327	296	-31	93	304	397	293	312	605	299	320	619	291	327	619	650	1,559	2,209
0131 Telecommunication carriers managers	-13	8	-5	-20	8	-12	2	8	11	2	9	11	2	9	11	-26	42	17
0213 Computer and information systems managers	-32	32	0	3	32	35	26	33	59	26	34	60	26	35	61	49	166	215
1423 Desktop publishing operators and related occupations	14	2	16	3	2	5	3	2	5	3	2	5	3	2	5	26	10	36
2147 Computer engineers (except software engineers and designers)	0	10	10	-3	10	7	9	10	19	9	10	20	9	11	20	25	50	75
2171 Information systems analysts and consultants	-84	80	-5	62	82	144	81	84	165	81	86	167	80	88	168	220	420	640
2172 Database analysts and data administrators	8	11	20	8	12	19	5	12	17	5	12	17	5	12	17	31	59	90
2173 Software engineers and designers	-35	13	-22	4	13	18	25	14	38	26	14	40	24	14	39	44	68	113
2174 Computer programmers and interactive media developers	-138	50	-88	11	52	63	72	53	125	72	54	126	72	56	128	89	265	354
2175 Web designers and developers	-23	9	-13	12	10	22	23	10	33	25	10	35	23	10	33	60	49	109
2281 Computer network technicians	3	46	49	15	47	61	26	48	74	29	49	78	26	51	76	99	241	340
2282 User support technicians	-29	32	4	-2	33	31	17	34	51	18	35	53	17	36	52	20	170	190
2283 Information systems testing technicians	0	3	4	0	4	3	4	4	8	4	4	8	4	4	7	12	18	30

Source: WEM LMI Forecasting Model

Manitoba's Economic Regions

Manitoba's economic regions include the Southeast region, South Central region, Southwest region, North Central region, Winnipeg region, Interlake region, Parkland region and North region.

Southeast Region

The Southeast Economic Region includes Census Divisions 1, 2 and 12.

- Southeast Region Economic Profile

The Southeast region can further be broken down into self-contained labour areas:

- Beausejour Brokenhead Area
- Emerson Area
- Hanover Area
- La Broquerie Area
- Lac du Bonnet Area
- Niverville Area
- Powerview-Pine Falls Area
- Ritchot Area
- Springfield Area
- St. Pierre-Jolys Area
- Steinbach Area
- Stuartburn Area
- Taché Area

South Central Region

The South Central Economic Region includes Census Divisions 3 and 4.

- South Central Region Economic Profile

The South Central region can further be broken down into self-contained labour areas:

- Altona Area
- Carman Area
- Cartwright Area
- Manitou Area
- Morris Area
- Winkler Area

Southwest Region

The Southwest Economic Region includes Census Divisions 5, 6, 7 and 15.

- Southwest Region Economic Profile

The Southwest region can further be broken down into self-contained labour areas:

- Boissevain Area
- Brandon Area
- Hamiota Area
- Killarney Area
- Melita Area
- Minnedosa Area
- Neepawa Area
- Rivers Area
- Souris Area
- Virden Area
- Wawanesa Area

North Central Region

The North Central Economic Region includes Census Divisions 8, 9 and 10

- North Central Region Economic Profile

The North Central region can further be broken down into self-contained labour areas:

- Gladstone Area
- Macdonald Area
- Portage la Prairie Area
- St. Francois Xavier Area
- Treherne Area

Winnipeg Region

The Winnipeg Economic Region includes Census Division 11, which is comprised of the City of Winnipeg and Rural Municipality of Headingley. A more detailed Winnipeg Metropolitan Region Economic Profile is also available.

Reports for this region include:

- City of Winnipeg
- Headingley Area

Interlake Region

The Interlake Region includes Census Divisions 13, 14 and 18.

- Interlake Region Economic Profile

The Interlake region can further be broken down into self-contained labour areas:

- Arborg Area
- East St. Paul Area
- Gimli Area
- Selkirk Area
- St. Andrews Area
- St. Clements Area
- St. Laurent Area
- Stonewall Area
- West St. Paul Area
- Woodlands Area

Parkland Region

The Parkland Region includes Census Divisions 16, 17 and 20.

- Parkland Region Economic Profile

The Parkland region can further be broken down into self-contained labour areas:

- Dauphin Area
- Grandview Area
- Roblin Area
- Russell Area
- Ste. Rose Area
- Swan Valley Area

North Region

The North Region includes Census Divisions 19, 21, 22 and 23.

- North Region Economic Profile

Northern Manitoba can further be broken down into these areas:

- Churchill Area
- Flin Flon Area
- Gillam Area

- [Grand Rapids Area](#)
- [Leaf Rapids Area](#)
- [Lynn Lake Area](#)
- [Snow Lake Area](#)
- [The Pas Area](#)
- [Thompson Area](#)