The Benefits of the Wireless Telecommunications Industry to the Canadian Economy in 2015

Prepared for:

The Canadian Wireless Telecommunications Association (CWTA)

Prepared by:

Nordicity

August 9, 2016

Table of Contents

1. Key Findings

In terms of GDP (Gross Domestic Product) and employment, companies in the Canadian wireless telecommunications ecosystem continue to generate increasing economic benefits to the Canadian economy.

The key economic trends exhibited by the industry in 2015 are summarized below:

- **Impact on GDP**: In 2015, the industry contributed $24.75 billion to GDP, an increase of 5.4% from $23.47 billion in 2014. The GDP impact includes:
  - **Direct Impact:** Direct contribution of $13.32 billion to Canadian GDP, generated through the sale of wireless services, devices and content to end users by network operators, dealers and distributors.
  - **Indirect Impact:** $5.43 billion indirectly contributed to the GDP, which represents procurements by network operators, dealers and distributors from suppliers of products, equipment and services.
  - **Induced Impact:** $6.00 billion is the additional contribution to the GDP, which represents increased spending in other sectors of the economy induced by disposable incomes generated within the wireless ecosystem.
- **Impact on Employment:** The wireless industry generated 138,800 full-time equivalent (FTE) jobs in 2015, including direct, indirect and induced effects – an increase of 4,700 FTEs or 3.5% from 2014.
- **Capital Investment:** Canadian wireless network operators made capital investments totalling $2.90 billion in 2015, an increase of 7.4% from 2014.

2. Introduction

2.1. Context

Competitiveness of national economies is increasingly driven by developments in the ICT sector and in turn, the wireless ecosystem is a key component and enabler of the ICT development.

In 2010, the Canadian Wireless Telecommunications Association (CWTA) commissioned *The Benefit of the Wireless Telecommunications Industry to the Canadian Economy*, providing a detailed analysis of the economic contribution of the wireless industry in 2008.

The current report is the 8th iteration of this publication, covering the 2015 calendar year. The report is intended to provide an independent assessment of the economic contribution of companies in the Canadian wireless telecommunications ecosystem to the Canadian economy as a whole. More specifically, this report provides quantification of the economic impact of companies in the Canadian

wireless telecommunications ecosystem in terms of direct, indirect and induced GDP; employment; and productivity gains.

2.2. Overview of Methodology

Our methodology consisted of three components: (i) primary research; (ii) secondary research; and (iii) economic analysis and modelling.

Nordicity collected data from six Canadian wireless network operators, which represented roughly 95% of the wireless industry revenues in 2015[1]. The data was collected using a combination of a customized survey and published sources such as annual reports of the operators and the CRTC's *Communications Monitoring Reports*. Survey respondents were asked to provide estimates of their cash flows, revenues and costs for the calendar year 2015. The results were fed into Nordicity's Canadian wireless telecommunications industry ecosystem model and were further analyzed to determine the overall economic impact[2]. In addition, Nordicity analyzed employee productivity (GDP per employee) in the wireless ecosystem.

3. The Canadian Wireless Telecommunications Ecosystem

The main elements of the Canadian wireless telecommunications ecosystem are[3]:

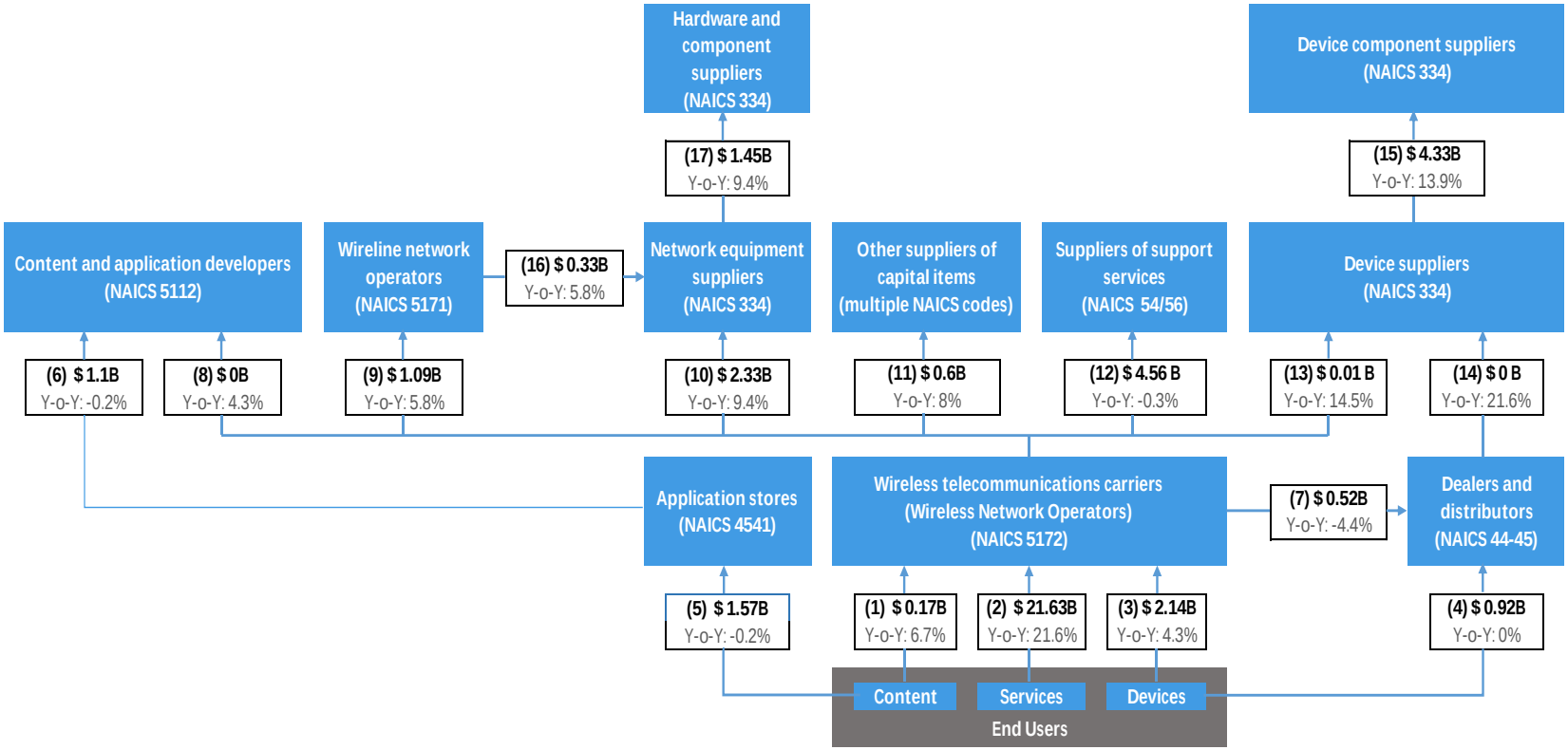
- **End-users**, who drive demand for services and products and obtain value from wireless network operators, applications-content and retail distributors of devices.
- **Service Providers,** who deliver wireless connectivity. This category includes providers of wireless telecommunications services, applications, content and devices.
- **Suppliers** of wireless network equipment, devices, computer hardware and software, and support services, as well as wireline network operators and developers of wireless applications and content.

In 2015, companies in the Canadian wireless telecommunications ecosystem generated **$48.96 billion**[4] in revenues, an **increase of 7.3% from $45.61 billion in 2014.** Exhibit 1 shows revenue estimates for the wireless ecosystem. These estimates were prepared using (i) detailed accounting information provided to Nordicity by the Canadian wireless network operators (WNO), and (ii) secondary data collected from published sources. The assumptions made and the modelling coefficients used in this report were validated using publicly available data and previous editions of this report.

It is encouraging to note that revenue flows across all levels of the Canadian wireless ecosystem generally grew in 2015 as compared to 2014. This overall growth in 2015 was driven, among other things, by a significant increase in wireless voice and data services (increase of 21.6% over 2014), accompanied with an increase in mobile applications and content (increase of 6.7% over 2014)[5], and end-users' acquisition of wireless devices (increase of 4.3% over 2015).

Exhibit 1 below provides an overview of the revenues generated across the Canadian wireless ecosystem.

Exhibit 1: Total Revenues Generated by the Canadian Wireless Ecosystem



Source: Nordicity's calculations based on its survey of wireless operators, and secondary data from Statistics Canada, CRTC and Information and Communications Technology Council reports.

The revenues shown in Exhibit 1 (above) are summarized in Exhibit 2 (below):

Exhibit 2: Summary of Revenues

From	To		Revenues ($ Billion)
End Users (Final Demand):	(1): Content: Wireless telecommunications carriers	0.17	
	(2): Services: Wireless telecommunications carriers	21.63	
	(3): Devices: Wireless telecommunications carriers	2.14	**26.42**
	(4): Dealers and distributors	0.92	
	(5): Application stores	1.57	
Service Providers	(6): Content and application developers	1.10	
	(7): Dealers and distributors	0.52	
	(8): Content and application developers	0.07	
	(9): Wireline network operators	1.09	
	(10): Network equipment suppliers	2.33	**16.44**
	(11): Other suppliers of capital items	0.60	
	(12): Suppliers of support services	4.56	
	(13): Device suppliers	5.17	
	(14): Device suppliers	1.01	
Suppliers (of equipment, devices, hardware, support services etc)	(15): Device component suppliers	4.33	
	(16): Network equipment suppliers	0.33	**6.10**
	(17): Hardware and component suppliers	1.45	
Total	**Sum of all activities**		**48.96**

Source: Nordicity's calculations based on its survey of wireless operators, and secondary data from Statistics Canada, CRTC and ICTC reports.

4. Economic Impact Analysis

This section provides economic impact analysis of the wireless ecosystem on GDP[6] and employment in Canada. GDP and employment impacts were further used to estimate productivity gains in the Canadian wireless ecosystem[7].

In the first stage of analysis, industry GDP generated through direct, indirect and induced effects was determined[8]. In the second stage, the GDP results were translated into employment figures – measured in terms of FTE jobs. Finally, GDP and FTE results were used to quantify the impact on productivity.

4.1. Impact on Gross Domestic Product (GDP)

The revenue estimates described in section 3 were used to calculate the overall contribution of the Canadian wireless telecommunications industry in 2015 to Canada's GDP.

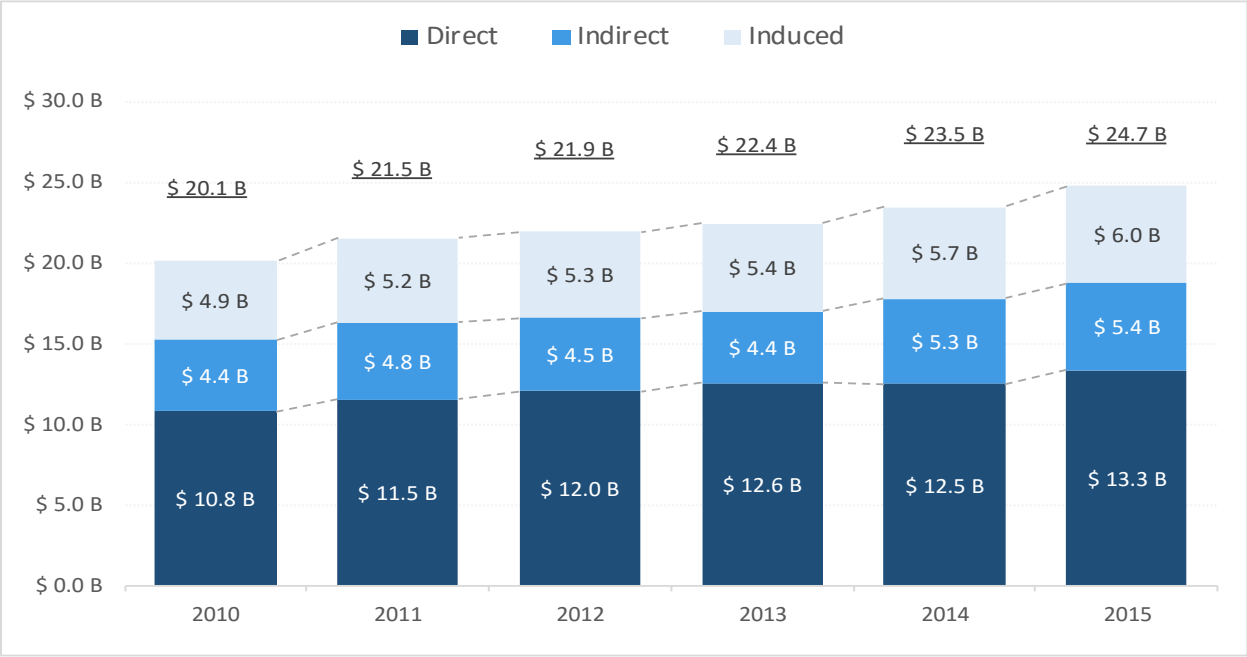
Direct and indirect GDP estimates were derived as follows:

- Based on the financial information collected through the survey and published reports (e.g. annual reports of the operators, the CRTC's *Communications Monitoring Report*), the revenues within the wireless ecosystem (as shown in Exhibit 1 above) were estimated.
- For any missing financial data, estimates were developed based on industry averages, historical trends, and re-validation of assumptions used in previous years' reports.
- Estimated revenues were then converted into *GDP estimates* based on relevant Statistics Canada *GDP-to-revenue ratios*.
- Finally, estimates were developed for sub-industries in order to calculate the portion of GDP that is retained in Canada[9].

The induced effects by sub-industry were calculated using multipliers from Statistics Canada.

Exhibit 3 (below) provides a comparative view of the contribution of companies in the wireless ecosystem to Canadian GDP in the period 2010-2015.

Exhibit 3: Total GDP Contribution of the Wireless Ecosystem to the Canadian Economy, 2010-2015



Source: Nordicity's calculations based on Nordicity survey of wireless operators, and secondary data from Statistics Canada, CRTC and ICTC reports.

As shown in Exhibit 4 (below), in 2015 companies in Canada's wireless ecosystem contributed a total of **$18.75 billion** to **GDP** through direct and indirect impacts. This represents an increase of 5.3% from $17.81 billion in 2014. The major contributor to this overall GDP increase was the **$0.82 billon (or 6.7%) increase in the contribution of wireless network operators to direct GDP** (from $12.20 billion in 2014 to $13.02 billion in 2015).

Exhibit 4: Direct and Indirect GDP Generated within the Canadian Wireless Ecosystem

Sub-industry	2014		2015		Growth
	$M	%	$M	%	%
Direct Impact	**12,470**	**70%**	**13,316**	**71%**	**6.8%**
Wireless network operators	12,199	69%	13,020	69%	6.7%
Dealers and distributors	241	1%	267	1%	10.7%
Application stores	29	0%	29	0%	-0.2%
Indirect Impact	**5,311**	**30%**	**5,432**	**29%**	**2.3%**
Content and application developers	570	3%	570	3%	0.0%
Wireline network operators	559	3%	591	3%	5.8%
Network equipment suppliers	625	4%	681	4%	8.9%
Hardware and component suppliers	132	1%	145	1%	9.4%
Other suppliers of capital items	88	0%	95	1%	8.0%
Suppliers of support services	3,160	18%	3,149	17%	-0.3%
Device suppliers	176	1%	201	1%	13.9%
Device component suppliers	0	-	0	-	-
Total (Direct + Indirect)	**17,781**	**100%**	**18,749**	**100%**	**5.4%**
Induced Impact	5,690	..	6,000	..	5.4%
Total (Direct+Indirect+Induced)	**23,471**	**..**	**24,748**	**..**	**5.4%**

Source: Nordicity's calculations based on Nordicity's survey of wireless operators, and secondary data from Statistics Canada, CRTC and ICTC reports.

Using Statistics Canada multipliers, GDP generated through the induced economic impact of the Canadian wireless industry was estimated at $6.0 billion in 2015, an increase of 5.4% from $5.69 billion in 2014.

In 2015, the Canadian wireless ecosystem contributed $24.75 billion to GDP (including direct, indirect and induced impacts), which represents a 5.4% increase in overall economic benefits from $23.47 billion in 2014.

4.2. Impact on Employment

The wireless industry creates and supports thousands of jobs across the Canadian economy, many of which pay wages well above the Canadian average[10]. Similar to GDP calculations, estimates of jobs generated in the Canadian wireless industry were based on calculations in terms of direct, indirect and induced impact. The employment estimate is based on total FTE jobs, which equals the number of employees that worked full-time plus the number of employees that worked part-time, converted to a full-time basis.

For this purpose, estimates were developed based on the salary and wage, financial, and employment data provided to Nordicity in response to the survey, as well as employee data provided in operators' annual reports. These amounts were used to calculate the labour share of GDP. In addition, estimates for labour share of the GDP were developed for sub-industries using relevant Statistics Canada data[11]. In the case of wireless telecommunications operators, the labour share of GDP was then converted into number of employees for each sub-industry using applicable data provided in Statistics Canada[12].

Exhibit 5 provides a detailed view of employment generated by companies in the Canadian wireless ecosystem through **direct** and **indirect** impacts. In 2015, the Canadian wireless industry was directly responsible for approximately **33,500 FTE jobs** and indirectly responsible for **48,800 FTE jobs**. In addition, the Canadian wireless ecosystem generated **56,500 FTE jobs** through its induced impact, for a grand total of **138,800 FTEs**.

In 2015, employment generated through direct impact increased by 4.5%, which is primarily the result of a 3.5% increase by wireless network operators.

Employment generated through indirect impact increased marginally, by 0.7%. This marginal increase is largely attributable to a 2.4% decrease in one subsector – suppliers of support services - that represented 34% of the employment generated through indirect impact. Certain other subsectors, however, showed significant increases in employment (e.g. network equipment suppliers increased by 10.3%, and device component suppliers by 15.3%).

The employment generated through induced impact increased by 5.4% compared to 2014.

Exhibit 5: Direct and Indirect Employment Generated within the Canadian Wireless Ecosystem

Sub-industry	2014		2015		Growth
	FTEs	%	FTEs	%	%
Direct Impact	**32,019**	**40%**	**33,466**	**41%**	**4.5%**
Wireless network operators	25,861	32%	26,776	33%	3.5%
Dealers and distributors	5,915	7%	6,451	8%	9.1%
Application stores	243	0%	239	0%	-1.7%
Indirect Impact	**48,472**	**60%**	**48,813**	**59%**	**0.7%**
Content and application developers	4,650	6%	4,582	6%	-1.5%
Wireline network operators	2,929	4%	2,924	4%	-0.2%
Network equipment suppliers	8,405	10%	9,273	11%	10.3%
Hardware and component suppliers	1,318	2%	1,338	2%	1.5%
Other suppliers of capital items	892	1%	918	1%	3.0%
Suppliers of support services	28,988	36%	28,291	34%	-2.4%
Device suppliers	1,290	2%	1,487	2%	15.3%
Device component suppliers	0	-	0	-	-
Total (Direct + Indirect)	**80,490**	**100%**	**82,278**	**100%**	**2.2%**
Induced Impact	53,585	..	56,501	..	5.4%
Total (Direct+Indirect+Induced)	**134,075**	**..**	**138,779**	**..**	**3.5%**

Source: Nordicity's calculations based on Nordicity survey of wireless operators, and secondary data from Statistics Canada, CRTC and ICTC reports.

4.3. Impact on Productivity

This section provides analysis of **productivity** in the Canadian wireless ecosystem. Productivity denotes the average GDP generated per FTE in the industry. Exhibit 6 below provides a detailed view of productivity in terms of **direct** and **indirect** impact.

As illustrated in Exhibit 6 below, **productivity** in terms of direct impact showed an increase of 2.2% compared to 2014. Wireless network operators exhibited the highest productivity gains, with a 3.1% increase compared to 2014. These productivity gains likely occurred through optimization of capital and labour inputs.

Exhibit 6: Productivity in the Canadian Wireless Ecosystem

Sub-industry	2014	2015	Growth
	$/FTE	$/FTE	%
Direct Impact	**389,461**	**397,911**	**2.2%**
Wireless network operators	471,737	486,261	3.1%
Dealers and distributors	40,808	41,433	1.5%
Application stores	120,216	122,019	1.5%
Indirect Impact	**109,574**	**111,290**	**1.6%**
Content and application developers	122,521	124,358	1.5%
Wireline network operators	190,867	202,278	6.0%
Network equipment suppliers	74,406	73,451	-1.3%
Hardware and component suppliers	100,409	108,208	7.8%
Other suppliers of capital items	99,144	103,997	4.9%
Suppliers of support services	109,005	111,308	2.1%
Device suppliers	136,776	135,020	-1.3%
Device component suppliers	..	..	..
Total (Direct + Indirect)	**220,911**	**227,869**	**3.1%**

Source: Nordicity's calculations based on Nordicity's survey of wireless operators, and secondary data from Statistics Canada, CRTC and ICTC reports.

Furthermore, according to Exhibit 6, most of the sub-sectors of the wireless ecosystem showed productivity gains in terms of direct and indirect impact in 2015 compared to 2014. Nonetheless, two sub sectors – network equipment suppliers and device suppliers - showed slight decreases in their productivity in 2015 because the increase in their FTEs was higher than the increase in their GDP contribution.[13]

5. Conclusion

Canada's wireless industry continues to increase its contribution to Canadian GDP. It is also a key growth enabler of the overall Canadian ICT sector. In 2015, the wireless industry generated a total of $48.96 billion revenues, an increase of 7.3% from 2014. In terms of GDP contribution, Canada's wireless industry generated an overall GDP of $24.75 billion (including direct, indirect and induced) in 2015.

Furthermore, the wireless industry provided over 138,800 FTEs in 2015, consisting of direct employment (33,500 FTEs), indirect employment (48,800 FTEs), and induced employment (56,500 FTEs).

6. End Notes

[1] For the purpose of this study, Nordicity has focused primarily on mobile wireless voice and broadband services. This report does not include data specific to the fixed wireless segment of the Canadian wireless telecommunications industry.
[2] In cases where data from operators were not available, Nordicity developed estimates using industry and historical trends.
[3] The wireless industry has traditionally been viewed in terms of a value chain, with separate and independent components. In recent years the development of the sector suggests that it is probably best viewed as an ecosystem, with a high degree of interdependence among the constituent segments.
[4] See Exhibits 1 and 2 for details.
[5] In 2015, end-users' spending on mobile applications and content – purchased from wireless network operators - increased 6.7%; however, purchases made directly from application stores, slightly decreased by 0.2%.
[6] The GDP numbers presented in this report are at current prices.
[7] For the purpose of this analysis, productivity is defined as GDP divided by the number of FTE figures (jobs):
Productivity = GDP ÷ FTE

[8] The definition of direct, indirect, induced and total economic impact is provided as follows:

- **Direct impact:** Refers to GDP and employment generated by Canadian wireless network operators themselves, as well as other sub-industries in the wireless ecosystem geared towards the final consumer, such as dealers, distributors and application-content stores.
- **Indirect impact:** Refers to GDP and employment generated by the sub-industries that supply inputs to Canadian wireless network operators, dealers, distributors and application-content retailers (including online and "bricks and mortar" stores). The sub-industries include wireline network operators, network equipment, computer hardware, component suppliers, and device suppliers, support services providers and so forth. The purchase of goods and services from these suppliers increases income and employment, which, in turn, increases the demand for other upstream suppliers, i.e. suppliers' suppliers.
- **Induced impact:** Refers to GDP and employment generated through the re-spending of income earned by the participants in the direct and indirect components of the ecosystem. That is, induced impact arises from re-spending that occurs in the economy at the household level, e.g. employees of wireless network operators using their income to purchase goods and services in the general economy.
- **Total economic impact:** The total economic impact is equal to the sum of the direct, indirect and induced economic impacts.

[9] A key challenge in calculating the 2015 economic contribution of the Canadian wireless industry to the Canadian economy was the determination of the relative portion retained in Canada versus the portion generated outside of Canada. This study focuses only on the contribution of companies in the wireless telecommunications ecosystem to the Canadian economy. For some sub-industries within the wireless ecosystem – such as wireless network operators –most (or all) of the value added occurs in Canada; for other sub-industries – such as device component suppliers – the value added occurs almost entirely outside Canada, specifically in countries where the components are designed or manufactured. To address this issue, after calculating the global GDP impact of the Canadian wireless industry, we estimated how much of the total GDP

generated by companies in the Canadian wireless ecosystem is retained in Canada. Estimates of the share of economic activity retained in Canada by sub-industry were constructed based on secondary research.

[10] According to Statistics Canada (CANSIM 281-0027), average weekly earnings of employees in Canada were $952.11 (or an annual average of $49,510) in 2015. As per Nordicity's estimates, average annual wages (earnings) in the Canadian wireless ecosystem were $69,028 in 2015.
[11] CANSIM Table 381-0022 (Input-Output Structure of the Canadian Economy in Current Prices). CANSIM terminated further updates to the series: Table 381-0022 (Input-Output Structure of the Canadian Economy in Current Prices)
[12] CANSIM Table 281-0027 (Survey of Employment, Payroll and Hours)
[13] More specifically, network equipment suppliers and device suppliers increased their employment between 2014 and 2015 by 10.3% and 15.3% respectively (per Exhibit 5); however, their GDP contribution increased by only 8.9% and 13.9% respectively (per Exhibit 4).