BENCHMARKING SMALL AND MEDIUM ENTERPRISES AS SUPPLIERS TO THE GOVERNMENT OF CANADA

INCLUSION, INNOVATION AND INTERNATIONAL TRADE

BY ALLAN RIDING, BARBARA ORSER & DIANE LIAO
COLLABORATORS QUANG DUONG & JÉRÔME CATIMEL

TELFER
CONNECTS YOU TO WHAT MATTERS

IN COLLABORATION WITH
Public Services and Procurement Canada
Services publics et Approvisionnement Canada

About the Telfer School of Management
The mission of the Telfer School of Management is to launch and accelerate management careers and influence sustainable organizational performance through the leadership of our graduates and the impact of our researchers. Building on the foundation of a unique location in a G8 Capital, our bilingual heritage and broad, multi–cultural diversity, the Telfer School of Management leverages strong relationships with organizations and communities to advance a better understanding of the challenges they face and the value that we can offer.

About Public Services and Procurement Canada
Public Services and Procurement Canada (PSPC) plays an important role in the daily operations of the Government of Canada as a key provider of services for federal departments and agencies. PSPC supports them in the achievement of their mandated objectives as their central purchasing agent, linguistic authority, real property manager, treasurer, accountant, integrity adviser, and pay and pension administrator. The department's vision is to excel in government operations, and its strategic outcome and mission is to deliver high–quality, central programs and services that ensure sound stewardship on behalf of Canadians and meet the program needs of federal institutions.

Acknowledgements
This research report was produced in collaboration with Public Services and Procurement Canada (PSPC). The authors wish to thank contributors Dr. Quang Duong and Jérôme Catimel. The research team also acknowledges Innovation, Science and Economic Development Canada as the agency responsible for constructing the survey employed in this study. The research has been supported by funding from PSPC, Social Science Humanities Research Council (Partnership Engage Grant, 892-2017-3005), and the Deloitte Chairs in the Management of Growth Enterprises at the Telfer School of Management.

Telfer School of Management
University of Ottawa
55 Laurier Avenue East
Ottawa, ON, Canada K1N 6N5
telfer.uOttawa.ca/en

To access *Benchmarking Small and Medium Enterprises As Suppliers to the Government of Canada* visit **telfer.uOttawa.ca/SMEprocurement2018-1**

CONTENTS

EXECUTIVE SUMMARY

This report provides new evidence-based insights, predicated on a representative sample of Canadian small and medium enterprises, about the extent to which being a SME supplier is associated with gender of ownership, innovation, international trade, and firm performance. The research also examines obstacles associated with federal contracting.

To the best of our knowledge, this is the first study to simultaneously examine gender of firm ownership, breadth and types of innovation and federal SME contracting, accounting for various owner and firm characteristics. The study addresses three critical questions that were identified in previous research (*Canadian Federal Procurement as a Policy Lever to Support Innovation and SME Growth*, 2017).

- **To what extent is the gender of firm ownership associated with the propensity to contract with the Canadian federal government?**
- **To what extent is being a supplier to the federal government associated with SME performance, in terms of the likelihood of innovation, exporting and growth?**
- **What are the primary obstacles associated with contracting with the Canadian federal government, as perceived by different categories of SME suppliers?**

While majority women-owned businesses are underrepresented as SME suppliers in some sectors, this was not the case in all sectors. Compared to SME non-suppliers, SME suppliers to the Government of Canada were relatively more likely to be innovators. The report also documents that type and likelihood of innovation vary by sector and by gender of business ownership. Perceptions about the obstacles to federal contracting also differ by sector and other firm and owner characteristics, including gender.

Informed by the literature and empirical findings, the report advances recommendations, including sector-focused strategies, to support economic policy goals and inclusive federal procurement practices.

KEY FINDINGS

PARTICIPATION OF WOMEN-OWNED SME SUPPLIERS DIFFERS BY SECTOR

Compared to majority men-owned SMEs, majority women-owned SMEs, taken as a whole, were less likely to contract with the federal government. Whereas 15.7 percent of Canadian SMEs are 'majority-owned' by women, majority women-owned firms account for only 10 percent of 'SME suppliers' to the federal government.

The study also found that gender differences in the likelihood of SMEs being federal contractors varied significantly by industry sector. Majority women-owned firms in the Wholesale & Retail and Other Services sectors were approximately half as likely to be SME suppliers as counterpart majority men-owned SMEs. Among Goods Producers and businesses operating in Professional, Scientific & Technical Services sectors, there were no significant gender gaps with respect to the likelihood of being an SME supplier.

SME SUPPLIERS ARE INNOVATORS

SME suppliers tended to be innovative firms and were 43 percent more likely to report at least one type of innovation than SMEs that did not contract with the Government of Canada ('SME non-suppliers'). SME suppliers were also 21 percent more likely to report multiple types of innovation.

The analyses found that in Professional, Scientific & Technical Services sectors, majority women-owned businesses were significantly *less likely* than majority men-owned firms to introduce any of the four types of innovation: product, process, marketing and organizational. These findings lend support to the mandate of PSPC to develop initiatives to increase the capacity of under-represented groups and to the 2018 federal budget commitment to support women in Professional, Scientific & Technical Services sectors.

Among Goods Producers and SMEs in the Wholesale & Retail sectors, participation in federal contracting was significantly, but negatively, correlated with being an intensive SME exporter.

Intensive SME exporters were less than half as likely to be contractors with the Government of Canada compared to all other SMEs. Among businesses operating in Professional, Scientific & Technical and Other Services sectors there was no statistically significant association between being an intensive SME exporter and being a SME supplier.

The data did not allow for direct assessment of the possible linkages between contracting with the federal government and subsequent firm growth. Previous research, however, has consistently found that innovation and growth are correlated and SME suppliers are relatively more likely than non-suppliers to be innovative firms.

OBSTACLES TO CONTRACTING DIFFER BY SECTOR AND BY OTHER FIRM AND OWNER CHARACTERISTICS

In order of descending frequency, obstacles to contracting with the federal government included complexity of contracting process, difficulties in finding contracting opportunities, high costs of the contracting process, long delays in receiving payment, difficulty in meeting contract requirements, and difficulty providing all services required. The analyses identified owner and firm characteristics of SMEs that were particularly affected, to a greater or lesser extent, by each of the obstacles.

'Complexity of the contracting process' was cited by 41.3 percent of all SMEs and 42.3 percent of SME suppliers. Smaller firms, immigrant business owners, majority women-owned Goods Producers and all SMEs operating in the Professional, Scientific & Technical Services sectors cited this particular obstacle with relatively greater frequency than otherwise comparable SMEs.

'Long delays in receiving payment' was cited as an obstacle by 23.8 percent of all SMEs and 21.7 percent of SMEs suppliers but significantly less so among SMEs in the Wholesale & Retail sectors and among majority men-owned businesses in the Professional, Scientific & Technical Services sectors.

'Difficulty providing all services required' (e.g., bundling of requirements in the statement of work published as part of an RFP) was cited by 14.9 percent of all SMEs and 14.0 percent of SME suppliers. All businesses in the Wholesale & Retail sectors were significantly more likely than other businesses to cite this obstacle.

'Difficulty in meeting contract requirements' (e.g., experience fulfilling similar contract requirements) was cited as an obstacle by 20.3 percent of all SMEs, and 19.6 percent of SME suppliers. This is the 'high bar' of eligibility. To be successfully selected for a federal contract, SMEs must first meet all contract requirements. Only then is the firm assessed based on rated criteria. There were no gender differences with respect to this particular obstacle.

OTHER FINDINGS

Most SME suppliers are older and larger

- Participation in federal contracting is associated with firm age and firm size for most, but not all SMEs. SME suppliers were more likely to be older and larger compared to non-suppliers in the Goods Producing, Wholesale & Retail, and Professional, Scientific & Technical Services sectors. Only in the 'Other Services' sectors was age of firm not significantly related to SME supplier status.
- Immigrant-owned businesses were significantly less likely to participate in federal contracting than counterpart businesses not owned by immigrants. Also, immigrant business owners were particularly likely to cite, as an obstacle to federal contracting, 'difficulty in finding contracting opportunities.' Immigrant-owned businesses were relatively more export-oriented and more likely to innovate compared to businesses not owned by immigrants.

Likelihood of innovating varies by gender and sector

The research examined likelihood of innovation and type of innovation on a sector specific basis. By doing so, this research documents sector-specific gender differences in the rates of innovation for some (but not all) types of innovation. Specifically, and accounting for other owner and firm characteristics:

- Among Goods Producers and Other Services sectors, there were no statistically significant gender differences in the likelihood of introducing *any of the four types* of innovation: product, process, organizational or marketing innovations.
- Across all sector categories, majority women-owned businesses were *as likely* as majority men-owned businesses to introduce *organizational innovations*, defined as a "new organizational method in your business practices, workplace organization or external relations."
- In the Wholesale & Retail sectors, majority women-owned businesses were significantly *more likely* than firms owned by men to introduce *marketing innovations*. Otherwise, no significant gender differences by type of innovation were identified within the Wholesale & Retail sectors. As noted, in the Scientific, Technical & Professional Services sectors, majority women-owned businesses were significantly *less likely* than counterpart majority men-owned SMEs to introduce any of the four types of innovation.

RECOMMENDATIONS

Based the empirical evidence presented throughout this report and the larger literature, the following recommendations are advanced.

Strategies to advance inclusive procurement

To increase the overall participation of women business owners from 10 to 15 percent in federal contracting, a *sector-specific* strategy is recommended.

- Underrepresentation of majority women-owned firms among SME suppliers in certain sectors (Other Services, Wholesale & Retail) motivates consideration of sector-based targets, quotas or set-asides for majority women-owned SME suppliers. Adjusting the assessment weights within category bids in particular sectors could also facilitate more successful bidding on federal contracts among underrepresented majority women-owned businesses.
- Gender-sensitivity procurement training for advisors of federally funded small business support services, accelerators and other innovation agencies is also recommended. Illustrative content includes awareness of gender influences in public procurement practices, building entrepreneurial confidence, and strategies to respond to RFPs.

Examination of federal program criteria is recommended to ensure that eligibility criteria (such as technical readiness) and assumptions about what constitutes 'innovation' do not dilute the federal commitment to increase the participation of women business owners in federal contracting. Furthermore:

- Introduction of federal procurement programs to support lead or first sales of *marketing* and *organizational* innovations, and innovation within the *services sectors* would complement military and product/technology dominant innovation support programs (for example, *Innovation for Defence Excellence* and *Security Program and Build in Canada Innovation Program*).
- The federal government is encouraged to develop a women-focused *Build in Canada Innovation Program* (BCIP) specifically targeting majority women-owned SMEs that operate in Professional, Scientific & Technical Services, Wholesale & Retail and Other Services sectors.

To encourage the participation of immigrant-owned businesses in federal contracting, the Office of Small and Medium Enterprises and Strategic Engagement (PSPC Acquisitions Branch) are encouraged to prioritize outreach and information dissemination about contracting opportunities and processes, in multiple languages, via newcomer programs, immigrant investment forums, and ethnic associations (such as, chambers of commerce and sector associations).

Related response strategies to support immigrant-owned businesses in federal contracting include showcasing entrepreneurial immigrant role models and establishing procurement mentoring programs focused on easing access to contract information (for example, finding opportunities through online tendering platforms, bid writing and submission processes), and pre-qualification (for example, examining the clarity of solicitation documents and getting on bid lists).

Federal funding could be tied to performance of small business support services, accelerators and other agencies in engaging, training and advising targeted groups of entrepreneurs (such as majority women-owned businesses) on successful bidding on federal contracts.

The study findings and above recommendations illustrate the importance of collaboration among federal agencies engaged in innovation, entrepreneurship, international trade and procurement support programming.

Analytics and reporting

Without analytics and reporting, strategic procurement policies may remain aspirational. At the same time, gathering of information and reporting are costly to SME suppliers and government. Evidence-based analysis can inform decisions regarding the trade-offs among cost rationalization, risk/complexity, competitiveness and socio-economic goals. Robust analytics of large samples are needed to determine the costs, benefits and conditions of alternative policy interventions, such as sole sourcing, weighted assessment criteria, set-asides, unbundling of contract requirements, complex versus more routine contracting, and size and sector-specific policy.

Analytics are also needed to examine the value of gathering owner/firm profile information to accurately monitor and report on the economic and social impacts of procurement policy. The development of *gender-based procurement protocols* will assist stakeholders in achieving gender equality and other economic policy goals.

The findings illustrate that important aspects of innovation may be masked in studies that employ simplistic and one-dimensional definitions of innovation, anecdotes, perceptual data, and convenience or aggregated samples. The findings present clear evidence that research on innovative entrepreneurship must consider sector context, breadth and the types of innovation specified in the *Oslo Manual* (OECD & Eurostat, 2005).

Questions that examine subcontracting relationships within federal supply chains should be included in forthcoming iterations of the *Survey of Financing and Growth of Small and Medium-sized Enterprises*. This is to enable assessment of downstream impacts of federal contracts on Canadian businesses. It should be stressed, however, that the scope of inclusive procurement is aimed primarily at primary or tier one contractors.

Size of enterprise and sector should be taken into account in constructing contract requirements. PSPC, and other government agencies, are encouraged to treat small firms in a manner similar to that of other underrepresented groups, and that a sector-specific approach to inclusive procurement policy and contracting be employed. That is, given that young and innovative start-ups disproportionately contribute to job creation (OECD, 2018), contract requirements should be examined to determine if criteria (such as years of experience or evidence of similar federal contracts) defeat opportunities for the federal government to support Canadian innovation.

This report provides evidence-based benchmarks to assist the Government of Canada in designing inclusive procurement policies and programs. The findings are expected to inform the mandate of Public Services Procurement Canada to modernize procurement practices, develop initiatives to increase the diversity of bidders on government contracts, and to publish metrics to measure government performance on the competitiveness, cost, and timeliness of procurements. The findings will also be of interest to other governments, small business support services, advocates, industry associations, and corporations that support supplier diversity.

INTRODUCTION

Governments around the world are examining public procurement as a means of delivering goods and services in a timely, economical and efficient manner, while increasing the participation of small and medium-sized enterprises in government contracting ("SME suppliers").[1, 2] This report is positioned at the convergence of other emergent policy challenges, including interventions to foster international trade, innovative entrepreneurship and gender equality through gender-based budgeting.

To this end, Public Services and Procurement Canada (PSPC) has been mandated to modernize procurement practices that support economic policy goals such as innovation, green and social procurement, and to develop initiatives to increase the diversity of bidders on government contracts. This includes businesses owned by underrepresented groups, such as women, Indigenous Peoples, persons with disabilities, and visible minorities. PSPC is also mandated to increase the capacity of these groups to participate in the system, and to publish clear metrics to measure government performance on the competitiveness, cost, and timeliness of procurements.[3] To further inform these initiatives, the Telfer School of Management has collaborated with PSPC to undertake a series of studies that examine the role of SMEs as suppliers to the Government of Canada (GC).

Benchmarking SMEs as supplier to the Government of Canada is an important area of inquiry for several reasons. First, participation of SMEs in federal contracting is increasingly a focus of policy development in OECD economies and multi-lateral trade negotiations (OECD, 2017). Governments seek to support strategic procurement by addressing obstacles to participation in federal procurement that particular groups of SMEs may encounter, and to employ demand-based innovation policies as a means of leveraging public funds for the attainment of social and economic objectives (Edquist et al., 2015). Research is needed to establish benchmarks and to quantify the extent to which strategic procurement directed to engaging diverse SME suppliers is associated with innovation, socio-economic policy objectives, and the spillover effects on firm performance.[4] Additional research is needed to construct procurement indicators, program assessment criteria and reporting protocols.

Second, procurement policy is a key element in the entrepreneurial ecosystem in which SMEs operate. Being a federal contractor can enhance firm credibility, provide lead customers, and support growth through incremental revenue (PSPC, 2013; Ram & Smallbone, 2003). Obstacles to government contracting (such as contract bundling, onerous administrative compliance requirements, restrictive selection criteria, lengthy milestones and payment intervals, and expanding work scope, unnecessarily complex requirements) can dilute the value of federal contracting for SMEs (Glover, 2008). Given SMEs' contributions to economic welfare, obstacles that impede access to, and deliverables of, government contracting should be minimized. To inform this process, this research examines the associations between perceived obstacles to federal contracting and SME owner and firm characteristics. These insights are important given the costs and benefits for both industry and government associated with alternative program interventions.

Third, the literature is ambiguous about the links among gender of ownership, innovation and exporting. To date, most Canadian studies that report on innovation among women entrepreneurs are based on convenience samples, perceptions and anecdotes. This research adheres to the methodological protocols employed by Statistics Canada (for example, Rosa & Sylla, 2016) to examine ways in which gender of business ownership, enterprise performance and innovation are related to contracting with the federal government. To accomplish this examination, multivariate statistical methods were employed in order to

1 In 2015, government procurement accounted for approximately 13.3 percent ($200 billion) of Canadian GDP. Between 2014 to 2015 and 2016 to 2017, SMEs won 35 percent of the total value of federal procurement contracts (approximately $5.5 billion per annum) awarded by Public Services Procurement Canada (PSPC, 2017).

2 Similarly, in 2016, government procurement represented approximately 12 percent of GDP across OECD member countries, 63 percent of spending occurred at sub-central levels of government (OECD 2017, p. 145).

3 See https://pm.gc.ca/eng/minister-public-services-and-procurement-mandate-letter

4 For example, findings from the first report in the Telfer research program were cited in the 2018 budget as the benchmark against which increased participation of women business owners in federal contracting is to be compared (Liao et al., 2017).

control simultaneously for a variety of owner and firm characteristics (Rosa & Sylla, 2016).[1] The study also adheres to Organization for Economic Cooperation and Development (OECD) *Oslo Manual* guidelines to incorporate the main types of innovation: specifically, product, process, marketing and organizational innovation (OECD & Eurostat, 2005). The findings are based on a large-scale, nationally representative sample of 10,397 Canadian SME owners.

Previous research has reported on gender and institutional barriers within innovation ecosystems, suggesting that failure to support innovation among women entrepreneurs wastes intellectual resources and contributes to inequality (Alsos, Ljunggren & Hytti, 2013; Strohmyer et al., 2017). Among Canadian SMEs, research documents that women, as well as some racialized, immigrant, Indigenous, LGBTQIS2 and entrepreneurs with disabilities, are less likely to benefit from innovation and small business support (Cukier, 2017). Reviews of entrepreneurship, incubator and innovation centres suggest that governance processes, and resources, are dominated by men and that in building their enterprises women face systemic barriers, such as unconscious bias, gendered stereotypes and discrimination (Women Entrepreneurs Ontario Collective, 2016: Canadian Taskforce for Women's Business Growth, 2011).

At the same time, women-focused interventions impact positively the growth performance of women-owned enterprises (Ference Weicker & Company Ltd., 2008). Yet, there is little empirical evidence to report on innovation and gender of firm ownership, or to address gender gaps in entrepreneurship and innovation policy and programming (Henry et al., 2017). This report responds to calls for research to examine the characteristics and contributions of women-owned SME suppliers, and the impact of women's enterprise and procurement programs (Canada-U.S. Council for Advancement of Women Entrepreneurs and Business Leaders, 2017; Henry et al., 2017; Orser, Riding & Weeks, 2017).

Finally, insights gained from examining SME participation in federal contracting may stimulate discussion about strategic procurement among governments, advocates, business support services, industry associations, and corporations that support supplier diversity programs. Recommendations to improve benchmarking, including indicators and assessment criteria to gauge the impacts of certification and diversity procurement programs, are advanced.

This report is the second in a series of studies that examines small and medium-sized enterprises that contract with the federal government ('SME suppliers'). The first report, *Canadian Federal Procurement as a Policy Lever to Support Innovation and SME Growth* presents a descriptive profile of SME suppliers, a review of the academic and trade literature, an annotated bibliography, and a description of Canadian and international supplier diversity support organizations. The report also identified the need to understand further the extent to which being a SME supplier to the federal government (being a "SME supplier") is associated with gender of ownership, innovation, exporting and firm performance.

The key research questions that this study examines are:

- To what extent is the gender of firm ownership associated with the propensity to contract with the Canadian federal government?
- To what extent is being a supplier to the federal government associated with SME performance, in terms of the likelihood of innovation, exporting and growth?
- What are the primary obstacles associated with contracting with the Canadian federal government, as perceived by different categories of SME suppliers?

1 Canadian scholars Fischer, Reuber and Dyke (1993, p. 155) articulated criteria necessary if cross-gender comparisons are to be investigated, stating: "Latent hypotheses that women are relatively disadvantaged cannot …be tested empirically when men are not included as respondents." They point out that to make valid cross-gender comparisons, empirical studies must not only include: (a) subsamples of both genders; but (b) should control for systemic differences in the attributes of firms (i.e., would similar men and women-owned firms be equally likely to secure a federal contract?). This study examines gender of ownership and innovation, controlling for various firm and owner characteristics, as specified by Strohmeyer, Tonoyan and Jennings (2017).

Report findings are based on data drawn from the 2014 *Survey of Financing and Growth of Small and Medium Enterprises* (SFGSME) and administrative data obtained by means of the Statistics Canada Linkable File Environment. The Telfer research team, in consultation with the PSPC Business Analytics Services Directorate, developed the analytical plan employed in this report. PSPC facilitated access to Statistics Canada data for Telfer researchers. The opinions and recommendations expressed are those of the Telfer research team and do not necessarily represent the views of Public Services and Procurement Canada.[1]

A summary of the empirical analyses and discussion of findings follow. To inform the federal commitment to increase the participation of women business owners in government contracting, these analyses emphasize observations about gender of firm ownership. Informed by the literature and empirical findings, recommendations are then advanced. Descriptions of the sources of data, methodologies employed, and detailed tables are presented in the appendices. These include a description of the study variables and methodology in Appendix A, and details of regression model estimates in Appendix B.

Research questions

- To what extent is the gender of firm ownership associated with the propensity to contract with the Canadian federal government?
- To what extent is being a supplier to the federal government associated with SME performance, in terms of the likelihood of innovation, exporting and growth?
- What are the primary obstacles associated with contracts with the Canadian federal government, as perceived by different categories of SME suppliers?

1 Even though every effort has been made to ensure the accuracy of the information supplied herein, the authors are responsible for any errors or omissions. The recommendations and opinions expressed in this report are those of the authors, and do not necessarily reflect the position of the Government of Canada.

GENDER OF FIRM OWNERSHIP

In 2014, 15.7 percent of SMEs were majority women-owned (SGSME, 2014). During the same period, only 10 percent of SME suppliers to the federal government were majority women-owned (Liao et al., 2017).[1] In 2018, the federal budget has specified that participation of women-owned businesses in federal contracting be increased by 50 percent, and that participation of other underrepresented populations be augmented. To inform policy, programming and practice, it is important to disentangle the relative importance of gender of firm ownership from the confounding effects of other characteristics, such as firm size or sector—which also vary by gender—as influences on involvement in federal procurement.

A fundamental consideration that relates to this issue is the question, "How should a women-owned firm be defined?" To date, there is no consensus about what it means to be a women-owned small business (Harrison et al., 2015; UN Women, 2017). The term "women entrepreneur," is used broadly, even denoting women-managed ventures (Aidis & Schillo, 2017).[2, 3] Recommendations for development of a definition of women-owned business are advanced in the Discussion of Findings section of this report. The definition used herein, is predicated on the proportion of women's ownership within the ownership team.

The underrepresentation of majority women-owned SMEs among SME suppliers may be attributable to several factors, including systemic gender differences in owner or firm characteristics. Alternatively, it may be that federal procurement needs are associated with sectors other than those in which majority women-owned SMEs are concentrated. Systemic barriers within the entrepreneurial ecosystem (for example, access to information about federal procurement opportunities) may also account for the underrepresentation of majority women-owned firms. To examine owner and firm characteristics associated with SME suppliers, an initial step in this analysis was to examine the concentration of majority women-owned firms by industry sector.

As shown in Figure 1 and Table 1, the concentration of majority women-owned businesses differs widely across sectors. Likewise, the concentration of majority women-owned SME suppliers differs across sectors.[4] Table 1 details the distribution of majority women-owned supplier SMEs, across sector categories. Majority women-owned businesses account for 23.2 percent of SMEs in Other Services, 15.8 percent of Wholesalers & Retailers, 15.8 percent in Professional, Scientific & Technical Services, and 6.2 percent of Goods Producers.[5] The proportion of majority women-owned SME suppliers among Goods Producers (6.9%) exceeded slightly the proportion of majority women-owned Goods Producers (6.2%). Women-owned SME suppliers do not appear to be under or overrepresented in this sector category. The largest gap in participation of SMEs in federal contracting was in Other Services, in which majority women-owned SMEs comprised 23.2 percent of all SMEs, but only 12.4 percent of SME suppliers.

---

1 The 2014 SFGSME (QJ.7) stated: "What percentage of your business is owned by women?" Question J.8 of the survey stated: "What percentage of your business is owned by (a) Aboriginal persons and (b) Persons who are from a visible minority group (other than Aboriginal)." Statistics Canada privacy protocols precluded analyses of respondents who identified as Aboriginal persons or visible minority due to small sub-sample size.

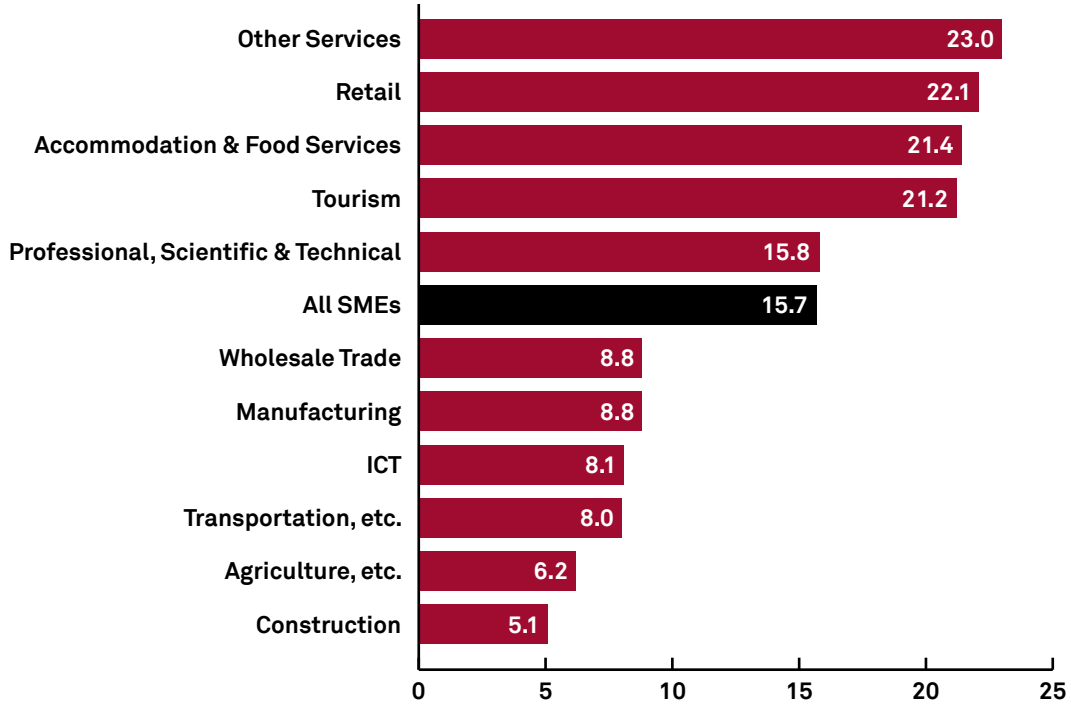
2 For example, among ISED funded programs, BDC (2016 to 2018) has targeted lending to *women-led* high-tech firms. Women's Enterprise Initiative's (2008) access to capital program review presents several definitions of women-owned: "A woman who owns and controls a business that is registered and located in the particular Pan-West province. ...Ownership and control is typically defined as *at least 51% management control* over the operations of the business across the provinces, with the exception of Manitoba where *ownership must be 50%*. Alberta Women Entrepreneurs (AWE) has also specified *owning at least 50% of voting shares or 50% partnership interest* in addition to the *51% management control*." (Ference Weicker & Company Ltd., 2008, p. 10).

3 The potential implications for the lack of definitional clarifications on the efficacy of federal procurement in international research on set-asides are evidenced by the South Africa set-aside targeted at women business owners. This example is instructive. While the historical context of Canada and South Africa differ, South Africa is one of three countries that have established targets for women-owned SME suppliers: "Some procuring entities had defined a women-owned business to mean a business having at least 50 percent black women ownership, others defined it as a business having 100 percent women ownership, and still others had no discernible definitions, despite purportedly tracking procurement spending on women-owned businesses [International Trade Centre, 2014]."

4 SME supplier status is based on the 2014 SFGSME question I.10: "Over the last 3 years, what percentage of your total sales were generated from contracts with the federal government?"

5 For analytical purposes, industry sectors are consolidated into four broadly defined categories: Goods Producers; Wholesalers & Retailers; Professional, Scientific & Technical Services; and Other Services. Sector reclassification was required to ensure the number of firms in each sector was sufficient to permit reliable multivariate analyses. Respondents were grouped onto one of the following broad sector categories, defined according to the 6-digit North American Industry Classification System (NAICS) system: (a) NAICS codes between 110000 and 399999 were *Goods Producers*, of which subsectors include Manufacturing, Construction, Primary, Agriculture, etc.; (b) NAICS codes between 410000 and 499999 were firms operating the *Retail and Wholesale sectors;* (c) *Professional, Scientific and Technical Services* sector was defined by NAICS codes 540000 to 549999; and (d) *Other Services* comprised the remaining firms within various services sectors, such as Accommodation, Food & Beverage, Educational Services, etc.

Figure 1: Percentage of Canadian majority women-owned SMEs, by sector



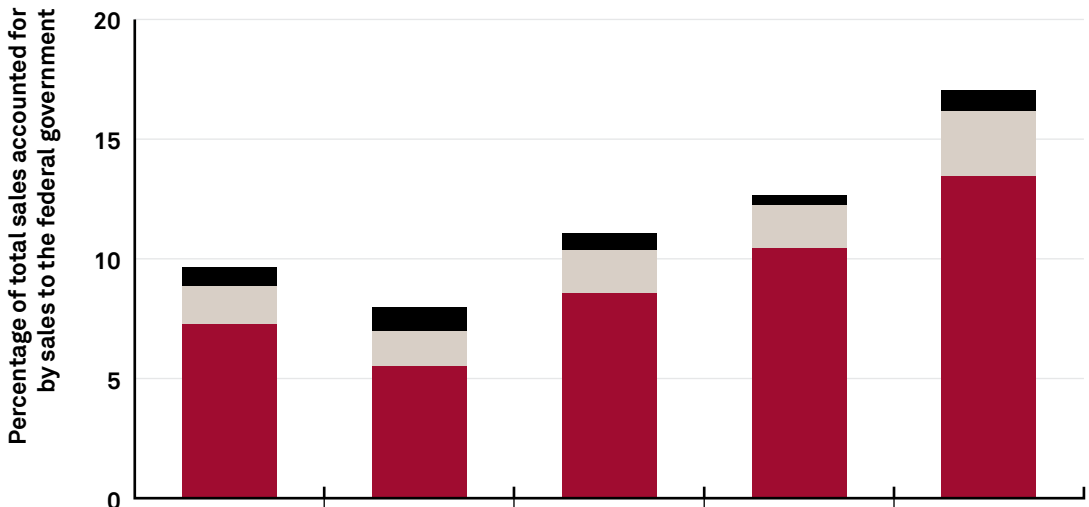
Source: Statistics Canada, *Survey on Financing and Growth of Small and Medium Enterprises*, 2014, Table 25.

Table 1: Percentage of majority women-owned SMEs and SME suppliers, by sector

	Goods Producers	Wholesale & Retail	Professional, Scientific, Technical	Other Services	All Sectors
Number of SMEs in sample	3,218	2,954	1,079	3,146	10,397
Percentage of firms that are SME suppliers within the sector	11.6%	9.8%	13.5%.	7.1%	9.8%
Percentage of majority women-owned SMEs within the sector	6.2%	15.8%	15.8%	23.2%	15.7%
Percentage of SME suppliers within the sector that are majority women-owned	6.9%	14.2%	12.7%	12.4%	10.0%

Sources: Statistics Canada, *Survey on Financing and Growth of Small and Medium Enterprises*, 2014; and Statistics Canada, Linkable File Environment.

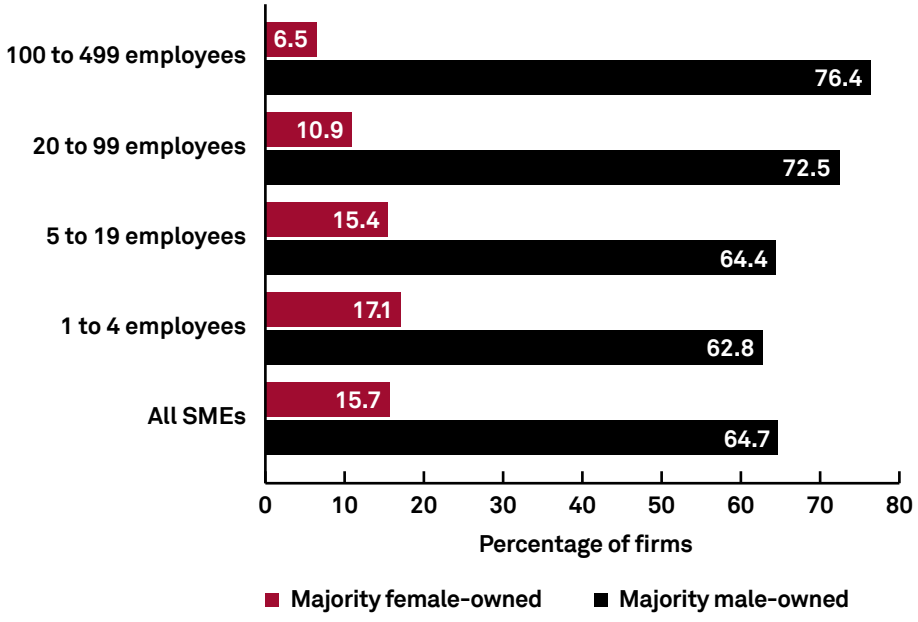
Figure 2: Percentage of small and medium enterprises accounted for by federal government contracts, by firm size



	All SMEs	1 to 4 employees	5 to 19 employees	20 to 99 employees	100 to 499 employees
More than 50% of all sales	0.8	1.0	0.7	0.4	0.9
Between 11% and 50% of all sales	1.6	1.4	1.8	1.8	2.7
Between 1% and 10% of all sales	7.3	5.6	8.6	10.5	13.5

Sources: Statistics Canada, *Survey on Financing and Growth of Small and Medium Enterprises*, 2014, Table 25.

Figure 3: Gender composition of Canadian SMEs, by firm size[1]



Source: Statistics Canada, *Survey on Financing and Growth of Small and Medium Enterprises*, 2014, Table 28.

1 Source: Statistics Canada, SFGSME, 2014, Table 28.

For most SME suppliers, the percentage of revenues that are accounted for by federal contracts is relatively small. Figure 2 presents, by firm size, the average proportion of SME suppliers' revenues accounted for by federal contracts. The figure demonstrates that the federal government is not a primary client for most Canadians SMEs. For example, for all employer SMEs (one to 499 employees), only 0.8 percent of firms report that more than 50 percent of revenues derive from federal contracts. For the vast majority of businesses with one to four employees, the percentage of revenues derived from federal contracts account for less than 10 percent of total revenues.

The analyses of Canadian SME suppliers also found that the likelihood of being a SME supplier varied with firm size. Among micro-enterprises (firms with one to four employees), 8.1 percent were SME suppliers, whereas 17.2 percent of medium-sized SMEs (firms with 100 to 499 employees) were SME suppliers (see Appendix A, Table A-2). Figure 3 presents the gender composition of SME ownership by firm size, indicating that majority women-owned businesses are systemically smaller than those owned by men.[1] Majority women-owned businesses may therefore retain, relative to firms owned by men, different operational or administrative capacity with which to participate in public contracting.

Accordingly, to estimate the degree to which majority women-owned businesses may be over or underrepresented among federal SME suppliers, this study simultaneously considered a variety of owner and firm characteristics. This required the use of multivariate methods of analysis to account for factors such as years of management experience, level of education, growth expectations, immigrant status, firm size, age of owner and sector category. Table B-1 in Appendix B shows the results of estimating multivariate statistical models of the likelihood of being a SME supplier, controlling for the impacts of these characteristics.

The detailed results in Appendix B, Table B-1 confirm that the likelihood of being a SME supplier varies by sector and is correlated with other firm and owner characteristics. Larger and more mature firms are relatively more likely to be SME suppliers (but not in the Other Services sectors). Younger firms (businesses less than two years old) in the Wholesale & Retail, and Professional, Scientific & Technical Services sectors were approximately half as likely to be SME suppliers as counterpart older firms. Intensive SME exporters (SMEs for which export sales account for more than 25 percent of total revenues), in the Goods Producing and the Wholesale & Retail sectors were less than half as likely to be SME suppliers compared to SME non-exporters.[2]

1 Also see the descriptive statistics presented in Appendix A, Table A-2 and Liao et al., 2017.

2 This research employed a definition of exporters that reflected those firms for which exports accounted for more than 25 percent of revenues (5.5 percent of SMEs): "intensive SME exporters." This is because intensive SME exporters are a more robust proxy of the decision to pursue international trade. The ratio avoids one-off, serendipitous or opportunistic transactions. Use of "intensive" export status is consistent with the literature that suggests, "the decision to export does not imply a simple extension of current production and distribution activities, but rather requires a firm to properly select the target foreign market, to tailor its products in order to fit local tastes and needs, and to adjust to different regulatory environments, such a decision involves sunk investments (Helpman et al. 2008; Chaney 2016). These investments may be substantial; thus the firm may be able to sustain them if it has access to adequate external financial resources." (Mancusi, Vezzulli, Frazzoni, Rotondi & Sobero, 2018, p. 177). Unless otherwise specified, the analyses used the narrower (intensive) definition of export.

Controlling for these attributes, the correlation between gender of ownership and the likelihood of being a SME supplier was sector-specific.

- In both the Wholesale & Retail and Other Services sectors, majority women-owned firms were approximately half as likely to be SME suppliers as majority men-owned firms.
- Among Goods Producers, there were no significant differences in the likelihood of contracting with the federal government between majority women-owned and majority men-owned businesses. However, among Goods Producers, firms owned equally by men and women were significantly less likely to be SME suppliers.
- In the Professional, Scientific & Technical Services sector, gender of firm ownership was not significantly correlated with the likelihood of being a SME supplier.

Majority women-owned SMEs and federal procurement

- Majority women-owned businesses were not uniformly distributed across industry sectors. Similarly, majority women-owned SME *suppliers* to the federal government were not uniformly distributed across sector categories.
- The likelihood of participation in federal procurement did not differ significantly by gender of ownership among Goods Producers or among businesses in the Professional, Scientific & Technical Services sectors.
- Majority women-owned businesses were, however, underrepresented as SME suppliers in Wholesale & Retail and Other Services sectors, sectors in which women-owned SMEs are prevalent.
- SMEs owned by immigrants in the Other Services sector and 'intensive SME exporters' among Goods Producers and Wholesalers & Retailers were relatively less likely to be SME suppliers.

INNOVATION

Canadian Federal Procurement as a Policy Lever to Support Innovation and SME Growth reported that, overall, SME suppliers are more likely than non-suppliers to develop or introduce innovations: 56.1 percent of SME suppliers compared to 41.6 percent of non-suppliers (Liao et al., 2017, p.8). This section of the report explores further the relationship between SME innovation and federal contracting, by addressing the question: *To what extent is being a supplier to the federal government associated with SME performance in terms of the likelihood and extent of innovative activities?* Innovator status was based on SFGSME (2014) question I.14:

> "In the last three years has your business developed or introduced any of the following innovations? An innovation must be new to your business, but it does not need to be new to your market: (a) A new or significantly improved good or service [**product innovation**]; (b) A new or significantly improved production process or method [**process innovation**]; (c) A new organizational method in your business practices, workplace organization or external relations [**organizational innovation**]; and (d) A new way of selling your goods or services [**marketing innovation**]?"

Table B-2 reports the results of estimating a multiple logistic regression model, for which the dependent variables was whether (=1) or not (=0) the firms reported *any type of innovation*. Among other findings, the model estimates indicate that SME suppliers are 43 percent more likely to report at least one type of innovation than non-SME suppliers.

Table B-3 reports the results of repeating this analysis, but in this case, by estimating four regression models where the dependent variable was defined as a particular type of innovation: whether (=1) or not (=0) the firm had undertaken, respectively, either *product, process, organizational* or *marketing* innovations. The results shown in Table B-3 confirm that SME suppliers are significantly more likely than non-suppliers to report introducing each of the four types of innovation. Table B-8 reports the results of modelling the *breadth of innovation*, defined as the aggregate number of different types of innovation reported by each firm.

Overall, SME suppliers embrace innovation (see Tables B-2, B-3, B-8). The propensity of Canadian SMEs to innovate was also positively and significantly associated with owners' level of education, growth expectations, immigrant status, firm size, and whether or not firms were intensive exporters. The likelihood of being an innovative SME was negatively associated with owners' age and for firms operating in Other Services sectors. In the context of these control variables, the correlation between innovative firms and SME supplier firms was statistically significant and positive.

TYPES OF INNOVATION

High-level aggregation of data can mask subtle underlying factors or associations that impact the likelihood of innovation. To examine further the antecedents of innovation reported in Table B-3, more granular analyses were conducted by repeating the analyses reported for each type of the four types of innovation (product, process, organizational and marketing) and within each of the four sector categories: a total of 16 regression models. The results are summarized in Table B-4 (product innovations), Table B-5 (process innovations), Table B-6 (organizational innovations) and Table B-7 (marketing innovations), that is the model estimates of the four types of innovation on a sector-specific basis, while accounting for various firm and owner characteristics.

PRODUCT INNOVATION

Table B-4 presents estimates of the four statistical models of the antecedents of product innovations, specific to each of the four sector categories. Findings common to all four sectors include:

- Product innovation (introducing a new or significantly improved product good or service) was highly correlated with owners' expectations of rapid future growth.
- Immigrant owners were significantly more likely than non-immigrants to report product innovation.
- Neither owner age or years of management experience were significant factors in the likelihood of product innovation.

- Higher levels of education were significantly and positively associated with the likelihood of product innovations in three of the four sector categories. The exception was Professional, Scientific & Technical Services sectors.
- The likelihood of product innovation was strongly and positively associated with firms for which exports accounted for more than 25 percent of revenue, in three of the four sector categories. The exception was in the Wholesale & Retail sectors.
- Gender of business owner was a factor in the Professional, Scientific & Services sectors (only), where majority men-owned businesses were significantly more likely than majority women-owned businesses to introduce product innovations (p-value=0.0043).

PROCESS INNOVATIONS

Table B-5 presents estimates of four statistical models of the antecedents of process innovations. Again, each table corresponds to one of the four sector categories employed in the analysis. Common findings across all four sectors categories indicate that:

- Business owners of larger firms were significantly more likely to report introducing a new or significantly improved process or method process innovation.
- Compared to other businesses, immigrant-owned businesses were significantly more likely to report process innovation across all industry sectors.
- Neither owner age, level of education or years of management experience were significantly associated with the likelihood of introducing process innovations. The exception was that of highly experienced Goods Producers, that were twice as likely to introduce process innovations compared to inexperienced Goods Producers.
- With the exception of businesses in the Professional, Scientific & Technical Services sectors (only), introducing a new or significantly improved production process or method was highly correlated with owners' expectations of future growth.
- In all but the Professional, Scientific & Services sectors, the likelihood of introducing a process innovation was strongly and positively correlated with being an intensive SME exporter.
- In the Professional, Scientific & Technical Services sectors, majority women-owned businesses were less than half as likely as majority men-owned businesses to introduce a process innovation, a find that was statistically significant (p-value=0.0044).

ORGANIZATIONAL INNOVATION

Table B-6 presents the model estimates of the antecedents of organizational innovations. Common findings across the sector categories suggest that:

- The owner and firm profiles of organizational innovators differ from that of process and product innovators. That is, the likelihood of organizational innovation was not significantly associated with being an immigrant business owner, years of management experience or education. It appears that organizational innovations are associated with younger business owners. Across all sectors, the likelihood of engaging in organizational innovation was independent of gender of firm ownership.
- As was evidenced for all other types of innovation, the likelihood of organizational innovation was significantly and positively associated with firm size and owners' expectations of high growth, across the four sector categories.
- Only in the Other Services sectors was the likelihood of introducing an organizational innovation significantly and positively associated with intensive SME export status.

MARKETING INNOVATION

The estimated antecedents of the likelihood of marketing innovations are shown in Table B-7. As was true for the other three types of innovation, expected firm growth and firm size were significantly and positively correlated with the likelihood of marketing innovations. In this case, however, education was not a factor in the Professional, Scientific & Technical Services sectors or in Other Services. Export status (that is, being an "intensive" SME exporter) was a factor but only in the Other Services sector. In the Professional, Scientific & Technical Services sectors, 'years of management experience' was strongly correlated with the likelihood of marketing

innovations. In the case of marketing innovations, post-estimation tests revealed that:

- As noted, in the Professional, Scientific & Technical Services sectors, majority women-owned SMEs were significantly *less likely* to be marketing innovators than were majority men-owned businesses (p-value=0.0324). This was also evidenced for organizational (p-value=0.067), process (p-value=0.004) and product (p-value=0.0.004) types of innovation in this sector.
- In the case of marketing innovations in the Wholesale & Retail sectors, majority women-owned SMEs were significantly *more likely* to report marketing innovations compared to majority men-owned businesses (p-value=0.0044).

BREADTH OF INNOVATION

Breath of innovation was defined as the total number of different types of innovation reported by owners. The dependent variable for this analysis ranged in value from zero (SMEs that reported no innovations) to four (SMEs that reported all four types of innovation).[1] The incidence of any type of innovation (Table B-2) and breadth of innovation (Table B-8) were positively correlated with being a SME supplier, level of education, positive growth expectations, younger owners (with the exception of marketing innovations), firm size, and (intensive) exporter status.

SUMMARY

After accounting for firm and owner characteristics, SME suppliers were 43 percent more likely than non-suppliers to report at least one type of innovation and 21 percent more likely to report multiple types of innovation (Table B-2 and Table B-8, respectively). The correlation applies, to differing extents, to SME suppliers within each of the four types of innovation: product, process, organizational, and marketing.

- Immigrant business owners were more likely, relative to businesses owned by non-immigrants, to report product and process innovations.
- Younger, but better educated, business owners were relatively more innovative.
- Innovation and expectations of future growth were closely correlated.
- Larger SMEs were, in general, more innovative than smaller SMEs.
- Intensive exporter SMEs were more likely to report product and process innovations.

Overall, factors associated with type of innovation differ by gender of firm ownership and sector. Among Goods Producers and firms in the Other Services sector there were no statistically significance gender differences in the likelihood of any type of innovation. In the Wholesale & Retail sectors, majority women-owned businesses were significantly more likely to report *marketing innovations* compared to firms owned by men. Otherwise, within the Wholesale & Retail sectors, no significant gender differences by any other type of innovation were identified.

Innovation and federal SME procurement

- The likelihood of all types of innovation (product, process, organizational and marketing) was significantly higher among 'SME suppliers' than SMEs that do not contract with the federal government.
- Innovation was more prevalent among intensive SME exporters, owners with more education, younger and immigrant business owners, and among business owners who hold strong expectations of firm growth.
- After accounting for various owner and firm characteristics, majority women-owned enterprises were significantly more likely than men-owned SMEs to develop or introduce a new way of selling goods or services (that is marketing innovation) in the Wholesale & Retail sectors. In the Professional Scientific & Technical Services sectors, majority women-owned firms were significantly less likely than men-owned firms to introduce any type of innovation.

1 For this reason, ordered probit regression analysis was employed for this analysis.

EXPORTING AND FEDERAL PROCUREMENT

Preliminary analysis of SFGSME (2014) data tables had revealed that SME suppliers were significantly *more likely* to export than SME non-suppliers (see Liao et al., 2017). To further investigate this particular finding, the parameters of multivariate logistic models of export propensity were estimated in order to estimate the correlations with factors that might relate to both government procurement and the likelihood of exporting. The dependent variable of these models was whether (=1) or not (=0) a firm exported goods, services or both. This section of the report documents the association between exporting and federal contracting. The analyses employed both the broad and narrow definitions of SME exporter.

To test for robustness of definitions, Table B-9 shows the results of this modelling for the two definitions of exporter firm: all SME exporters (11.8 percent of SMEs) and intensive SME exporters (exporters for which export sales accounted for more than 25 percent of total sales; 5.5 percent of SMEs). Contrary to earlier descriptive findings (Liao et al., 2017), the more granular analyses reported here find that SME exporters were significantly less likely to be SME suppliers than non-exporters after controlling for such characteristics as firm size, sector, innovation, etc. The difference in the results is likely attributable to the impact of the control variables, particularly innovation, on export propensity. As noted in the previous section, innovative SMEs are especially likely to export; however, the model estimates presented in Table B-9 controls for the impact of level of innovation (whereas the initial findings reported by Liao et al. (2017) did not account for this important firm characteristic). That is, the findings by Liao et al. (2017) are arguably driven by the correlations between: (a) export intensity and innovation; and (b) innovation and being an SME supplier. That is, innovation appears to be a driver of both exporting and procurement.

Table B-9 allows for these firm characteristics with the result that export status and being an SME supplier were significantly negatively correlated. This result held for all SME exporters as well as for the alternative definition, 'intensive SME exporters.' The analyses also revealed that:

- Recent immigrants were significantly more likely than non-immigrants to be intensive SME exporters.
- Intensive SME exporters were more likely to report more years of education and management experience, and positive expectations of firm growth.
- Intensive SME exporters tended to be larger firms, in terms of employment, and engaged in a greater breadth of innovation.
- In the Wholesale & Retail sectors, majority women-owned firms were significantly less likely to export than other firms (that is, SME exporters and intensive SME exporters).

Exporting and federal procurement

- The likelihood of being an intensive SME exporter was significantly less among SME suppliers than among SMEs that do not contract with the federal government.
- SMEs owned by immigrants were significantly more likely than business owned by non-immigrants to be intensive SME exporters.

OBSTACLES TO FEDERAL CONTRACTING

Table B-10 reports the results of estimating logistic models of a variety of obstacles to contracting with the federal government, as perceived by Canadian small business owners across various owner and firm characteristics.[1] The multivariate analyses identified particular sub-groups of businesses that were relatively more, or less, likely to cite each obstacle.

- 'Difficulty finding contract opportunities' was cited as an obstacle by 30.8 percent of respondents. In particular, immigrants, smaller firms, and firms within the Professional, Scientific & Technical Services sectors were relatively more likely, and to a statistically significant extent, to cite this as an obstacle. Majority women-owned Goods Producers were also relatively more likely to cite difficulty finding contract opportunities.
- 'Complexity of the contracting process' was cited as an obstacle by 41.3 percent of all SMEs and 42.3 percent of SME suppliers. In particular (and to a statistically significant extent) this obstacle was more frequently cited (three times that of otherwise comparable businesses) by majority women-owned businesses in the Professional, Scientific & Technical Services sectors. More experienced business owners were less likely to perceive complexity of the contracting process as an obstacle.
- 'Long delays in receiving payment' was cited as an obstacle by 23.8 percent of all SMEs and 21.7 percent of SMEs suppliers. Firms in the Wholesale & Retail sectors, along with majority men-owned SMEs in the Professional, Scientific & Technical Services sectors, were less likely to identify payment delays as an obstacle compared to all other SMEs.
- 'Difficulty providing all services required' (e.g., bundling of requirements in the statement of work published as part of the RFP) was cited by 14.9 percent of all SMEs and 14.0% of SME suppliers. SME suppliers appear to bid on what they can do. Businesses in the Wholesale & Retail sectors were significantly *more likely* than firms in other sectors to cite this as an obstacle. Conversely, majority women-owned businesses in Other Services were significantly less likely to cite 'difficulty providing all services required in contract.'
- 'Difficulty in meeting contract requirements' (e.g., experience fulfilling similar contract requirements) was cited as an obstacle by 20.3 percent of all SMEs, and 19.6 percent of SME suppliers. This is the 'high bar' of eligibility. To be successful selected for a federal contract, SMEs must first meet all contract requirements. Only then is the firm's bid assessed based on rated criteria.

Implications of the study findings, in the context of the research literature, are discussed in the next section.

Obstacles to federal contracting

- The frequency in which Canadian business owners identified particular obstacles to federal contracting varied across sector categories. 'Complexity of the contracting process' was the most frequently-cited obstacle, particularly among immigrants and firms in the Professional, Scientific & Technical Services sectors and among majority women-owned Goods Producers.
- Businesses in the Wholesale & Retail sectors were significantly *more likely* than firms in other sectors to cite 'difficulty providing all services required' as an obstacle. Conversely, majority women-owned businesses in Other Services were significantly *less likely* to cite 'difficulty providing all services required in contract.'

1 For each model, the dependent variable was whether or not a respondent had identified that particular barrier.

DISCUSSION OF FINDINGS

This study presents new insights about the extent to which being a SME supplier to the Government of Canada (SME supplier) is associated with gender of firm ownership, innovation and exporting.

GENDER OF FIRM OWNERSHIP

A key finding of this study is that the representation of majority women-owned SME suppliers differs significantly across sector categories, accounting for various firm and owner characteristics. Majority women-owned SME suppliers were significantly underrepresented in Wholesale & Retail sectors and in Other Services, such that majority women-owned businesses were less than half as likely to be SME suppliers as otherwise counterpart majority-men-owned businesses in both sectors. The likelihood of being a SME supplier did not differ by gender of firm ownership in either the Goods Producing or Professional, Scientific & Technical Services sectors.

Majority women-owned businesses are characterized by other significant within sample differences. The study findings present evidence that there are gender distinctions with respect to perceived obstacles to federal contracting. Majority women-owned Goods Producers were relatively more likely than other SMEs to cite 'difficulty finding contract opportunities' as an obstacle. Majority women-owned businesses in the Professional, Scientific & Technical Services sectors were more likely to cite both 'complexity of contracting process' and 'long delays in receiving payment' as obstacles. It is worth noting that 'difficulty finding contract opportunities' and 'complexity of contracting process' are frontend, gateway obstacles. There were no gender differences with respect to frequency of citing 'difficulty meeting all contract requirements.'

One explanation for the gender gap in the representation of majority women-owned SME suppliers in 'Other Services' is the intangible nature of the service offering. That is, it may be more difficult in services sectors than in goods sectors to codify standards. In the Other Services sectors, supplier reputation and client interaction, rather than product specifications, may make it relatively more difficult for prospective SME suppliers to discern if their firm is capable of meeting contract requirements. The gap may reflect gender disparities in entrepreneurial self-efficacy and its impact on estimating firm capacity (Wilson, Kickul & Marlino, 2007). Research has shown that business owners' perceptions about firm capability (such as organizational resources) are associated with the decision to tender on government contracts (Karjalalainen & Kemppainen, 2008). Gender influences may reflect differences in firm size, or scale such as the number of employees to deliver services.

Collectively, these explanations suggest a need for the federal government to introduce training and advisory services for women business owners to bolster their awareness of contracting opportunities and their ability to estimate tendering and contract fulfillment capability. This also infers creation of gender-sensitivity procurement training targeted to intermediaries, such as trainers and advisors within federally funded small business support services. This may be facilitated by working with existing women's enterprise centres such as the Women's Enterprise Organizations of Canada (WEOC) to co-create and co-deliver training and advisory materials and services within innovation and entrepreneurial ecosystems.

A sector-specific outreach strategy is recommended to achieve the government commitment to increase the overall participation of women business owners from 10 to 15 percent in federal contracting. This recommendation may also help to achieve the recommendation of the *Canada-United States Council for Advancement of Women Entrepreneurs and Business Leaders* (Canada-U.S. Council, 2017), that is, to reserve 5 percent of total federal contracts for women-owned small businesses.[1] Set-asides or adjusting the assessment weights within particular sector categories could also expedite successful bidding on federal contracts among underrepresented majority women-owned businesses.

1 A lead recommendation of the Canada-U.S. Council (2017) is for the Canadian government to reserve 5 percent of total federal contracts for WOSBs and to implement this program within the next 12 months: "We recommend the following steps: Measure the baseline of current government procurement won by women-owned businesses. Set goals, including a top-level target of at least 5 percent. Establish a program of third-party or governmental certification to minimize abuse. Continue coordinated and transparent outreach efforts to women entrepreneurs and implement targets and accountability for government agents. Publish public annual reports on the program's uptake."

INNOVATION

The findings documented in this report demonstrate links between type and breadth of innovation, immigrant status, gender of firm ownership, sector and federal contracting. That is:

- The likelihood of innovation was generally positively and statistically significantly associated with immigrant business owners, younger and more educated business owners, owner growth expectations, firm size and export status.
- Innovative firms were significantly more likely than non-innovators to be SME suppliers. SME suppliers were also more likely to report each of the four types of innovation than SME non-suppliers.
- Furthermore, breadth of innovation, defined as the number of different types of innovation, was positively and significantly associated with being SME suppliers (that is, the likelihood of being an SME supplier increased significantly with breadth of innovation).

These insights support the need for inclusive procurement initiatives. They also confirm that a key barrier facing immigrant entrepreneurs is 'difficulty finding contracting opportunities.' Yet, immigrant entrepreneurs are a particularly innovative and export-oriented group of business owners. Moreover, a recent multi-country study on innovative entrepreneurship reports that innovation within immigrant-owned start-ups fosters social mobility and promotes ethnic and social inclusiveness (Breschi, Lassébie & Menon, 2018, conducted by the Organizational for Economic Cooperation and Development). These findings therefore illustrate the intersectionality of immigrant status, other owner characteristics and the potential role of federal procurement in encouraging inclusiveness.

Interestingly, majority women-owned businesses in the more populated 'Other Services' sector (that is, a sector characterized by more and smaller firms) were significantly more likely to report *marketing innovations* than majority men-owned businesses.

The analyses found that in Professional, Scientific & Technical Services sectors, majority women-owned businesses were significantly less likely than majority men-owned firms to introduce each

of the four types of innovation. The empirical findings lend support to the mandate of PSPC to develop initiatives to increase the *capacity* of under-represented groups and the 2018 federal budget commitment to support women in Professional, Scientific & Technical Services sectors.

One potential explanation for the finding that women in Professional, Scientific & Technology Services sector are less likely to introduce any of the four types of innovation may relate to documented gender differences in ICT adoption and development among Canadian SMEs (Orser, Riding & Stanley, 2012; Orser & Riding, 2017). This finding may relate to owners' educational credentials, arguably with respect to the STEM disciplines. However, anecdotal evidence has suggested that women entrepreneurs are less likely to be the beneficiaries of innovation support services (Canadian Taskforce for Women's Business Growth, 2011; Women's Enterprise Ontario Collective, 2016). Connecting these points, the findings reported here imply that federal investment could usefully be directed at increasing the likelihood and types of innovation among majority women-owned suppliers (bidders) in the Professional, Scientific & Technical Services sectors. This includes construction of gender-sensitive and, arguably more women-friendly support services (e.g., dedicated and mainstream SME training and advisory programs, monitoring of organizational culture). Federal funding of innovation and small business support agencies (such as, incubation centres and accelerators) could be tied to demonstrated performance in engaging, training and advising women business owners in successfully securing federal contracts.

EXPORTING

Interestingly, the likelihood of being an SME exporter was significantly and *negatively* correlated with the likelihood of being an SME supplier. Because the vast majority of Canadian SMEs are small (53.4 percent have fewer than 5 employees; 87.4 percent fewer than 20), we speculate that lack of scale restricts business owners from allocating their limited resources to both international trade and to government contracting. That is, the lack of scale may require business owners to focus either on an export strategy or on a procurement strategy. It may be that growth strategies and resource allocation decisions differ between SME exporters and SME suppliers, differences that reflect operational and administrative capacity. Moreover, the entrepreneurial knowledge and networks needed to participate in international trade may differ from those associated with federal contracting.

From a supply-side perspective, Goods Producers may prefer to sell existing (as is) products in international markets, rather than alter goods to meet the specifications of federal RFPs. For some small businesses, it may be more efficient to sell goods abroad than conduct business with the federal government, given concerns such as expenses associated with time to manage client expectations, develop proposals and administer and report on deliverables (Glover, 2008).

INCLUSIVE PROCUREMENT, INNOVATION AND ENTREPRENEURSHIP POLICIES

In considering the implications of the report findings, the work of Andrea Rowe (2016) is particularly helpful. Rowe examined Canadian innovation policies from a gender equality perspective. She described implicit bias and gender-related supply-side and demand-side constraints that are a consequence of innovation policies that are assumed to be 'gender-neutral' (that is, policies do not reflect systemic gender differences). Rowe argues that a holistic approach is required to address policy frameworks that have historically ignored women within innovation, procurement and entrepreneurial policy discourses. For example, according to Rowe (2016, p, 97):

> *On the supply side, grants and R&D funding are strongly correlated with industries that fit masculine norms of innovation, such as the automotive, aerospace, and natural resource extraction industries (Bedell, 2014). ...On the demand side, governments have mechanisms to stimulate innovation through* procurement programs*, supporting technologies before they are commercially viable. However, these strategies are typically employed in very high-cost, large-scale innovation projects when it is advantageous to share risk with the public sector. In many cases, innovations that are smaller in scale and deal with social innovation, rather than technological innovation, do not meet the requirements for government procurement programs.*

Rowe (2016) also writes that federal gender-neutral innovation policies encourage women to self-select or opt out of entrepreneurial careers, while prioritizing large over small-scale investments, scalability of enterprises over depth of socio-economic change, and technological over non-technical innovation. The consequences are policy and program decisions that are "highly gendered." Through this perspective, we consider the implications of the study findings.

DEFINING WOMEN-OWNED BUSINESSES

The federal government is encouraged to define 'women-owned' small businesses in a clear and consistent manner. Standardized definitional criteria are necessary to establish program eligibility, construct comparable reporting metrics, reduce the likelihood of 'store front' agreements, tokenism, fraud, and to avoid market confusion and the facade of inclusion and diversity. Such practices do not further women's economic empowerment. It is recommended that federal government employ the definitional criterion advanced by United Nations (UN) Women: that a definition for women-owned businesses should, at a minimum, include the following elements (UN Women, 2017: p. XIII):

- At least 51 percent unconditional ownership by one or more women;
- Unconditional control by one or more women over both the long-term decision-making and the day-to-day management and administration of the business operations; and
- Independence from non-women-owned businesses.

Confounding the need for definitional consistency is the recognition of alternative gender identities, and mandate to employ GBA+ analysis within program reviews. The implications of employing gender-responsive procurement (e.g., UN Women, 2017), gender-smart, feminist or inclusive definitional criteria within procurement warrant industry consultation.[1]

Once agreement is reached about how to define a women-owned business, it will be necessary to certify whether or not individual businesses conform to the agreed definition if interventions are to be effective.

CERTIFICATION OF WOMEN-OWNED BUSINESSES

The need to arrive at broad agreements of what constitutes a 'women-owned' business holds ramifications for the certification criteria and process of SME suppliers. This issue has been noted in at least three large-scale studies that have examined the efficacy of the U.S. Women-Owned Small Business Program (WOSBP). Miller-Kermani (2009) concludes that SME certification programs, as currently constituted, collectively and individually, were not associated with any incremental impacts on bid frequency or success rates in the WOSBP. Orser, Riding and Weeks (2017) report similar conclusions. A review of the WOSBP conducted by the U.S. Congress Office of Government Accountability (2015) found that the frequent practice of self-certification as women-owned within the WOSBP was problematic. Hence, the emulation of the U.S. Women-Owned Small Business Program self-certification process is not supported by these arms-length evaluations. Yet, this is a procurement approach cited as a good practice by *The Canada-United States Council for Advancement of Women Entrepreneurs and Business Leaders*, 2017. Rather, the studies endorse third-party certification of women-owned small businesses within set-asides, and call for ongoing reporting and accountability in federal contracting for target groups of business owners.

1 The UN defines *gender-responsive procurement* as the selection of goods, civil works or service that take into account their impact on gender equality and women's empowerment: "As well as treating female and male suppliers on equal terms, *gender-smart procurement* seeks to prioritize positive outcomes for gender equality through enabling the purchase of gender-sensitive goods and services." (Harris Rimmer, 2017 p. 4)

INNOVATION SUPPORT PROGRAMS

The links between innovation, gender and federal contracting are evident. This infers the need for collaboration of procurement, innovation, entrepreneurship and gender policies, across federal agencies. Participation of women business owners could be further increased through existing programs that seek to stimulate Canadian innovation among SMEs and support first or lead customer sales (e.g., *Build in Canada Innovation Program; Innovation for Defence Excellence and Security Program*). PSPC is encouraged to work with Status of Women Canada to conduct GBA+ analysis of procurement and innovation program eligibility criteria (such as, *Technical Readiness Level*). Because governments tend to focus on sectors in which women business owners are underrepresented (such as green infrastructure, AI, military, and ICT) the definitional criteria of "innovation" might usefully be reviewed. Programs to support marketing and organizational innovation, and innovation in the services sector could complement existing military and product/technology funding envelopes.[1]

PSPC analytics might also play a leadership role in monitoring and reporting on the gender composition of procurement innovation programs, including applicant and award recipient profiles. This is to ensure that the federal commitment to increase the participation of women-owned businesses is not diluted by federally funded innovation programs that, by definition, tend to support men-dominated industry sectors. Key lessons learned can be disseminated across PSPC client agencies.

The Office of Small and Medium Enterprises and Strategic Engagement (PSPC, Acquisition Branch) should prioritize outreach about contracting opportunities and procurement protocols in the sectors in which they are underrepresented: Wholesale & Retail and Other services sectors by working through trade associations and women's enterprise organizations.

ANALYTICS AND REPORTING

Research on strategic procurement, SME suppliers and interventions to foster gender equality and innovative entrepreneurship is at an early stage. The review of the literature published in the first phase of this research program identified no large-scale studies with which to benchmark SME contracting with the Government of Canada. To the best of our knowledge, this is the first study ever to simultaneously examine gender of firm ownership, breadth and types of innovation and federal SME contracting, accounting for various owner and firm characteristics. In part, this is because measuring the impacts of public procurement presents challenges with respect to data collection and methodology. This report therefore provides benchmarks on, and directions for, the participation of SME suppliers in federal contracting.

This study confirms research that describes the linkages of entrepreneurship, innovation and gender as complex and multidimensional (Strohmeyer, et al., 2017). Without employing sector and type of innovation analyses, a higher likelihood of innovation among women-owned businesses in one sector can offset a lower likelihood of innovation among women-owned businesses in another sector. When averaged across sectors, gender differences counterbalance each other and obscure gender gaps. This lends to disagreements among and between researchers, practitioners and policymakers about the associations between gender and innovation, and by extension, participation of women in federally funded innovation support programs (e.g., need for gender-sensitive program interventions and women-only business support services). Lack of granular analysis gives license to entrenched perspectives that reflect anecdotal aspects of individuals' lived experiences. A consequence can be misinformed public policy.

Robust analytics of large samples are needed to determine the costs and benefits of alternative policy interventions (such as unbundling of requirements, set-asides, broader assessment criteria, and simplification of the procurement

1 This recommendation aligns with a growing consensus among governments that "piecemeal approaches and reforms designed in silos are no longer sufficient" to impact gender equality (OECD, 2017, p. 32). This infers the need to embed gender equality in budgeting practices, procedures, regulatory/program impact analyses, and procurement management. There also remains a need to co-ordinate gender-based (GBA+) budgeting and policy/program formulation to ensure that limited resources support policy priorities (OECD, 2107).

process) that seek to address the identified obstacles to federal contracting and supplier diversity. Evidence-based analysis will also inform decisions regarding the trade-offs among cost rationalization, risk/complexity, competitiveness and socio-economic policy goals.

Access to owner/firm profile information is key to monitoring and reporting on the economic outcomes of procurement policy and practice. Without objective and accurate reporting, strategic procurement policies may remain aspirational yet costly to governments and industry. At the same time, gathering and analysis of information require significant effort, although some key parameters are currently available (e.g., firm size, sector of operations). A *collaborative* data analytics strategy (across federal agencies, sectors and in consultation with industry, non-profit organisations and academia), will help achieve quality and consistency at lowest possible costs.

A key finding of the predecessor report, *Canadian Federal Procurement as a Policy Lever to Support Innovation and SME Growth* (2017) is that there remain opportunities to learn from existing SME procurement programs. Examination of the short and long-term outcomes of innovation support programs, such as *Build in Canada Innovation Program*, is warranted. Research on SME contracting should include procurement support organizations, such as Canadian Aboriginal and Minority Supplier Council, WEConnect International Canada, WBE Canada, and LGBT Supplier Diversity Program and Certification (among others).

Gender-based analysis of expenditures and purchases and gender-responsive procurement practices are new to most governments.[1] Given increasing commitments to apply gender-based analysis and to employ strategic procurement, development and publication of federal *gender-based procurement protocols* will assist stakeholders in achieving gender equality and other policy goals.

This study also presents evidence about the importance of methodological rigour in examining business owner and firm characteristics and SME contracting. Without longitudinal data, for example, it was not possible to estimate the causal associations among innovation, gender of business ownership, being a SME supplier and enterprise performance. We were unable to test whether being innovative leads to federal contracts, or if federal contracts enable innovation. In other words, is innovation an antecedent of federal contracting, or a consequence thereof? The study also illustrates the value of advanced procurement analytics and need to develop relevant and robust indicators to monitor progress and report on SME suppliers.

This research focussed on SMEs that were direct contractors to the federal government. An important direction future research relates to addressing the questions examined here but with respect to the population of subcontractors—a topic about which little is known due to a lack of data. It is therefore strongly recommended that questions pertaining to subcontracting relationships within federal supply chains be included in future iterations of the *Survey of Financing and Growth of Small and Medium-sized Enterprises*. In addition, the federal government is encouraged to develop a holistic database on the nature of SME suppliers and subcontractors. Such information is necessary in order to yield insight about the impacts of federal contracts in supply chains.

Finally, the 2014 SFGSME provides a useful inventory of questions about obstacles to SME procurement that can be adopted by government agencies and private corporations that seek support supplier diversity. Adoption of these questions would enable inter-governmental, cross-country and private/public sector comparisons, information that can be used to enhance SME tender and contract opportunities.

1 According to the 2016 OECD *Survey on Gender Budgeting*, approximately a third or 12 OECD countries have introduced *gender mainstreaming* in budgetary processes (OECD, 2017). Illustrative practices include gender-based analysis plus (GBA+) training in Canada, *pro forma* statement of impacts on gender equality attached to new policies coming to government, and structured/systematic gender differential impact assessments of policies and programs.

NEXT STEPS IN THE RESEARCH PROGRAM

The first and this second phase of research have drawn on the 2014 *Survey of Financing and Growth of Small and Medium Enterprises* (SFGSME) conducted by Statistics Canada and Innovation, Science and Economic Development Canada. The next phase of work will focus on strategies to enhance the entrepreneurial ecosystems for Canadian SMEs, including majority- women- and Indigenous-owned SMEs. The research plan entails semi-structured interviews with key informants from government, industry, SME training organizations and accelerators. The research will also examine the role of the Canadian federal government as an enabling—or constraining—factor, in supporting innovation and enterprise growth.

STUDY LIMITATIONS

The limitations of using secondary analyses of data are well documented. For example, the survey sample was limited to 'employer' SMEs and did not include self-employed contractors to the federal government. Furthermore, the survey did not include questions about subcontracting enterprises, data that would likely provide further useful insights about SMEs in federal supply chains. Statistics Canada privacy protocols limited the extent to which the research team could examine smaller subgroups of business owners, such as visible minorities and Aboriginal persons.[1]

Much of the analyses defined "gender" as a dichotomous (women/female, men/male) variable. This definition does not capture gender identities or the experiences of intersecting groups of marginalized small business owners. Comparing women/female and men/males implicitly assumes within group homogeneity and fails to recognize that gender influences reside not only in social identity and business decisions but also "...in social structure, power, class structure, and politics" (Orser et al., 2009, p. 935).

To inform policy goals, research is needed to document experiences related to social identities (e.g., intersectionality of gender, race, ethnicity, immigrant status, etc.), psychological influences of decision-making (such as, entrepreneurial confidence and persistence) and socializers and support systems that impact bid frequency and success rates.

The report findings are based on data drawn from the 2014 iteration of SFGSME. The findings do not capture impacts of subsequent federal procurement policies and programs on SME contracting. Finally, the findings outlined here reflect only the perspectives of 'successful bidder' and do not capture SMEs that submitted bids but were not successful. Future research could provide a better sense of the obstacles to contracting by drawing on the population of SMEs that were 'unsuccessful' in their federal government bids.

CONCLUSIONS

The report findings are consistent with the premise that strategic procurement is a means of supporting innovative Canadian SMEs. Sector and gender influences on federal procurement and innovation were reported. The study also identified the effect of owner and firm characteristics on perceived obstacles in selling to the federal government. The report therefore establishes Canadian benchmarks and a standard of reporting that can be replicated by other government agencies and private sector corporations that seek to support inclusive procurement and supplier diversity.

The report presents evidence to suggest that PSPC, in collaboration with other federal agencies, should employ firm size and sector-specific procurement policies. These findings demonstrate the need for the federal government to support advanced procurement analytics to inform on the trade-offs between contracting efficiency and mandate to increase the diversity of SME suppliers. The current lack of analytical capability limits development of evidence-based policies. Procurement analytics will also help to ensure that Canadian SMEs benefit from contracting with the Government of Canada.

1 The *Procurement Strategy for Aboriginal Business* (PSAB) supports Aboriginal business capacity development on behalf of the federal government of Canada. Through mandatory set-asides, voluntary set-asides, joint ventures and partnerships, the Strategy aims to assist Aboriginal businesses to compete for and win federal contracting opportunities.

APPENDIX A: METHODOLOGY AND DATA

DATA SOURCES

The empirical research reported here relies on data extracted from the *Survey of Financing and Growth of Small and Medium-Sized Enterprises* (SFGSME, 2014). At time of writing, the 2014 SFGSME was the most recent among a series of six such surveys conducted periodically since 2000.

The sampling frame for the SFGSME surveys is the *Canadian Business Register*, a comprehensive list of businesses engaged in the production of goods and services in Canada, comprising total of 837,590 enterprises in the target population. By means of a series of screening questions, the following types of enterprises were excluded from the target population: enterprises with no employees and those with more than 500 employees; enterprises with less than $30,000 in gross revenues; non-profit organizations; joint ventures; government agencies; etc. From this sampling frame, a sample of 19,998 enterprises was selected. Survey data were collected between February 5 and June 11 of 2015 yielding a total of 10,397 responses, a response rate of 52.0 percent, obviating, to some extent, concerns about non-response and key-informant biases.

The data collection was stratified and included oversampling from populations of interest and then applying weights appropriate to ensuring that the results were representative of the underlying population of employer SMEs. In addition to the large sample size, the survey was designed to address interests in specific sub-populations of businesses, including SMEs that participate in public procurement, those that had signed contracts with PSPC. To this end, the sampling frame was augmented with the addition of 673 SMEs known to have been suppliers to the federal government, of which 419 responded to the survey, a response rate of 62.3 percent of SME suppliers

The following tables describe the variables employed in this research. Table A-1 specifies variable definitions; Table A-2 summarizes salient attributes of the firms and owners.

Table A-1: Definitions of variables

Owner characteristics	Variable description
Gender of ownership	Variable that identifies gender of business ownership: majority women-owned; majority men-owned; and equally owned by men and women
Owner age	Age of the primary owner of the SME, measured in years
Immigrant	Whether (=1) or not (=0) respondent had immigrated to Canada
Education	Highest level of education attained by the primary owner
Growth expectations	Owner's expected annual growth rate from 2014 to 2017. The categorical variable included: negative growth; no growth; 1% to 10%; 11% to 20%; and >20% annual growth rates.

Firm characteristics	Variable description
Firm age	Age in years (Statistics Canada, Linkable File Environment).
Firm size	Size was measured by the natural logarithm of full-time equivalent employees. Source: Statistics Canada, Linkable File Environment.
Export status	Two alternative measures were employed. One measure defined the SME as an exporter if exports accounted for any sales in 2014. The alternative measure defined the SME as an exporter if exports accounted for more than 25 percent of total sales.
Industry sector	Industrial sector in which the SME operates. Four broad sector categories were defined according to North American Industry Classification System (NAICS) classifications: ▪ Goods Producers: NAICS 110000 to 399999; ▪ Wholesale and Retail: NAICS 410000 to 499999; ▪ Professional, Scientific & Technical services: NAICS 540000 to 549999; ▪ Other Services: NAICS 510000 to 539999 and 550000 to 919999.
Innovation	Dichotomous variable that takes the value of 1 if respondent reported a product innovation, process innovation, marketing innovation or organizational innovation within the last three years, and value of 0 otherwise.
Breadth of innovation	Number (0 to 4) representing how many among the four types of innovation (product, process, organizational and marketing) were reported.

Table A-2: Descriptive statistics of key variables

Variables	Percentage of all SME employer firms*	Percentage of firms that are SME suppliers
All SMEs	**100.0**	**9.8**
Firm size		
1 to 4 employees	53.4	8.1
5 to 19 employees	34.0	11.1
20 to 99 employees	11.1	12.7
100 to 499 employees	1.6	17.2
Growth		
More than 20% per year	8.5	10.6
11–20% per year	10.2	13.5
1–10% per year	45.6	10.0
Stable (no growth)	17.0	7.4
Negative growth	10.5	10.4
Age of firm		
Less than two years	7.6	
3 to 10 years	29.9	
11 years or more	62.5	
Innovation		
Product	24.0	12.2
Process	16.6	12.8
Organizational	17.8	13.2
Marketing	18.2	11.7
Any of the above	39.0	12.0
Breadth of innovation		
None		8.2
1 type	18.5	10.8
2 types	13.9	12.8
3 types	8.2	12.7
4 types	4.7	13.5
Industry sectors		
Goods Producers	28.8	11.7
Primary sectors	6.2	4.5
Construction	16.1	14.6
Manufacturing	6.4	11.0
Wholesale & Retail	24.0	9.8
Wholesale	5.8	12.9
Retail	12.9	8.9
Transportation & Warehousing	5.3	8.5
Professional, Scientific and Technical Services	11.3	13.5
Other Services	35.9	7.1
All exporters (export sales >0% of total sales)	11.8	11.3
Intensive exporters (export sales >25% of total sales)	5.5	7.7

Variables	Percentage of all SME employer firms*	Percentage of firms that are SME suppliers
Owner Attributes		
Age of owner		
<30 years old	1.9	9.9
30 to 39 years old	12.7	8.2
40 to 49 years old	26.1	9.9
50 to 64 years old	47.5	10.4
65+ years old	11.8	8.8
Education of owner		
Less than high school	8.0	8.9
High school	22.8	8.6
College/CEGEP/Trade School	30.7	9.9
Bachelor's degree	24.1	10.7
Master's degree or above	14.4	10.2
Born outside of Canada (Immigrants)	23.6	7.2
Management experience of owner		
Less than 5 years	6.3	
5 to 10 years	18.7	
More than 10 years	75.0	
Gender of business ownership		
100% men-owned	53.7	10.3
51% to 99% men-owned	11.0	13.4
Equal men/women	19.7	8.6
51% to 99% women-owned	2.2	11.4
100% women-owned	13.5	6.1

*Estimates are based on the SFGSME (2014) survey weighted to be representative of the population of Canadian SME that employ between one and 499 employees.

GENERAL METHODOLOGICAL APPROACH

The methodology relied primarily on a logistic regression framework, a method in which the dependent variable is dichotomous, typically set equal to either 0 or 1 to reflect a binary outcome. For example, the initial use of logistic regression employed in this research used a binary dependent variable = 0 if firm was not a government client and = 1 if firm had been a supplier to the federal government (SME supplier) during the most recent three-year period. Independent variables included categorical, binary and continuous characteristics of the firm and the owner per Table A-1.

THE LIKELIHOOD RATIO

Within the various tables, the E(ß) column refers to the "likelihood ratio." The likelihood ratio expresses the change in the dependent variable (for example, the likelihood of being a SME supplier) per unit/standard deviation change in the corresponding independent variable. The tables that follow report these likelihood ratios, E(ß), rather than coefficient estimates because of the relative ease of interpreting likelihood ratios.[1] For example, as indicated in Table B-1, the likelihood ratio corresponding to 'process innovator' is 1.24. This means that process innovators are 24 percent more likely to be SME suppliers than a firm that is not a process innovator; likewise, if the likelihood ratio was 0.8, this would indicate that process innovators would be 20 percent less likely to be SME suppliers than a firm that is not a process innovator.

1 Mathematically, the likelihood ratio, E(ß), is equal to e(CE), where CE are the coefficient estimates derived from the estimation of the model. The odds ratio represents the constant effect of a predictor X, on the likelihood that an outcome will occur. For example, an odds ratio of 1.05 means that the odds of the outcome will increase by 5 percent for all values of X.

APPENDIX B: STATISTICAL MODEL ESTIMATES

ESTIMATION OF LIKELIHOOD OF BEING SME SUPPLIERS, BY GENDER OF OWNERSHIP AND SECTOR

In this model, the dependent variable was a dichotomous variable that designated whether (=1) or not (=0) respondent firms were SME suppliers to the federal government. Control variables included those listed in Table A-2. Each of the four models presented is specific to each of four broadly defined industry sectors: Goods Producers (NAICS 110000 and 399999), Wholesale & Retail (NAICS 410000 to 499999); Professional, Scientific & Technical Services: (NAICS 540000 to 549999); and Other Services (NAICS 510000 to 539999 and 550000 to 919999). The results of this analysis are displayed presently, in Table B-1.

Table B-1: Likelihood of being SME suppliers, by gender of ownership and sector

LOGISTIC REGRESSION (SME supplier or not)				
	Goods Producers	Wholesale & Retail	Professional, Scientific & Technical	Other services
Variables	E(ß)	E(ß)	E(ß)	E(ß)
Control Variables				
Immigrant	NS	0.75	1.23	0.58 ***
Age of owner	NS	NS	(<0) ***	(>0) *
Years of management experience	NS	NS	(>) *	NS
Levels of education	NS	NS	(>0) **	NS
Growth expectations	(>0) *	NS	NS	NS
Innovation				
Product innovator	NS	NS	NS	2.04 ***
Process innovator	NS	NS	NS	NS
Organizational innovator	NS	1.75 **	NS	NS
Marketing innovator	NS	NS	NS	NS
Independent variables				
Firm size (ln of number of employees)	1.31 ***	1.24 ***	1.18 *	NS
Young firms (less than 2 years)	NS	0.54 *	0.43 *	NS
Intensive SME exporters	0.43 **	0.25 ***	NS	NS
Variable of interest				
Gender of business ownership				
Majority men-owned (reference category)				
Equally men/women-owned	0.59 ***	NS	NS	NS
Majority women-owned	NS	0.44 ***	NS	0.48 **
Observations	2,747	2,338	990	2,373
p-value	0.000	0.000	0.001	0.002
Pseudo R^2	0.043	0.058	0.066	0.048

Coefficients significant at 0.01***, 0.05** and 0.10*, NS = not statistically significant.

MODELLING THE RELATIONSHIP BETWEEN SME SUPPLIERS AND INNOVATION

To detail further reporting of the associations among firm and owner characteristics on innovation, additional multivariate analyses were conducted. These analyses were based on SME owners' responses to the following survey question (Q I.14 on the SFGSME questionnaire):

> *"In the last three years has your business developed or introduced any of the following innovations?"*
>
> - *A new or significantly improved good or service (product innovation)?*
> - *A new or significantly improved production process or method (process innovation)?*
> - *A new organizational method in your business practices, workplace organization or external relations (organizational innovation)?*
> - *A new way of selling your goods or services (marketing innovation)?"*

The first logistic regression model used, as dependent variable, whether (=1) or not (=0) the firm had reported ANY of the above types of innovation. Independent variables were the same as those employed for Table B-1. The model estimates from this analysis are summarized in Table B-2.

The next series of four logistic regression models used, as dependent variables, whether or not the firm had reported each of the four types of innovation; respectively, product, process, organizational, and marketing. The results of these estimations are detailed in Table B-3. These were further refined by estimating the likelihood of each 'type of innovation' for each of the four sector categories employed here (16 regression models, Tables B-4 to B-7).

An additional regression model was an ordered probit analysis, in which the dependent variable was the number (0 to 4) of types of innovation (that is: none, product, process, organizational, marketing) reported by each firm. Independent variables were based on those listed in Appendix A. The results of the analyses are reported in Table B-8.

Table B-2: Logistic regression model of *any* form of innovation

LOGISTIC REGRESSION (any form of innovation vs no innovation)	
	At least one type of innovation
Variables	**E(ß)**
Immigrant-owned	1.38 ***
Age of owner	<1.0 **
Owner experience	NS
Level of education	>1.0 ***
Firm size (ln of number of employees)	1.26 ***
Majority women-owned	NS
Growth expectations	
Negative growth	Reference category
No growth	1.15
1–20% growth	1.88 ***
20% or more	4.03 ***
Intensive SME exporters	1.94 ***
Sector	
Goods Producer	Reference category
Wholesale & Retail	0.97
Professional, Scientific & Technical	0.92
Other services	0.83 **
Whether or not a supplier to the federal government	1.43 ***

Table B-3: Effect of SME owner and firm characteristics on types of innovation

LOGISTIC REGRESSION (type of innovator, or not)				
	Product Innovation	Process Innovation	Organizational Innovation	Marketing Innovation
Variables	E(ß)	E(ß)	E(ß)	E(ß)
Immigrant	1.39 ***	1.65 ***	1.09	1.37 ***
Age of owner	<1.0 **	<1.0 **	<1.0 ***	NS
Owner's experience	NS	NS	>1.0 *	>1.0 *
Level of education	>1.0 ***	>1.0 ***	>1.0 ***	>1.0 ***
Firm size (ln number of employees)	1.24 ***	1.22 ***	1.32 ***	1.19 ***
Majority women-owned	NS	0.83 *	NS	1.28 **
Growth expectations	>1.0 ***	>1.0 ***	>1.0 ***	>1.0 ***
Goods Producers	Reference category			
Wholesale & Retail	NS	0.52 ***	NS	1.38 ***
Professional, Scientific & Technical Services	NS	0.64 ***	NS	NS
Other services	NS	0.59 ***	NS	NS
Intensive SME exporters	2.00 ***	1.95 ***	1.53 ***	1.49 ***
Whether or not a supplier to the federal government	1.34 ***	1.30 **	1.40 ***	1.20 *

Sources: Statistics Canada, *Survey on Financing and Growth of Small and Medium Enterprises*, 2014; Statistics Canada, Linkable File Environment.
Coefficients sign. at 0.01***, 0.05** and 0.10*, NS = not statistically significant.

Table B-4: Antecedents of *product* Innovation, by sector

	Goods producers	Wholesalers & Retailers	Professional, Scientific & Technical Services	Other Services
	E(ß)	E(ß)	E(ß)	E(ß)
Immigrant owner	1.46 **	1.27 *	1.68 **	1.48 ***
Age of owner				
30 to 39	1.01	1.09	0.65	0.94
40 to 49	0.69	0.82	0.66	0.58
50 to 64	0.67	0.69	0.64	0.58
65 or more	0.57	0.62	0.29 *	0.42 *
Years of experience				
5 to 10 years	0.91	0.94	0.93	0.98
11 or more years	1.11	1.19	0.89	1.14
Level of education				
High school diploma	0.96	0.94	0.59	1.72 *
College/CEGEP/Trade school	1.29	1.38	0.99	2.63 ***
Bachelor's degree	2.12 ***	1.95 ***	1.18	2.72 ***
Master's degree or above	2.18 ***	1.57	1.00	3.24 ***
Growth expectation				
No growth	1.13	1.53	0.56	1.07
1–10% growth	1.44	2.26 **	1.09	1.34
11–20% growth	2.16 **	4.16 ***	1.94	3.54 ***
20% or more	3.41 ***	6.89 ***	4.99 ***	3.04 ***
Firm size (ln number of employees)	1.20 ***	1.23 ***	1.52 ***	1.21 ***
Young firms (<2 years old)	0.79	0.75	0.85	1.05
Gender of ownership				
Majority men	0.78 **	1.04	1.11	0.83
Majority women	0.73	1.25	0.46 **	0.80
Intensive SME exporters	2.34 ***	0.90	4.79 ***	1.89 **
Pseudo R-squared	0.077	0.063	0.178	0.067
p-value	0.000	0.000	0.000	0.000

Table B-5: Antecedents of *process* innovation, by sector

	Goods producers	Wholesalers & Retailers	Professional, Scientific & Technical Services	Other Services
	E(ß)	E(ß)	E(ß)	E(ß)
Immigrant owner	1.51 ***	2.20 ***	2.12 ***	1.51 ***
Age of owner				
30 to 39	0.96	2.39	2.06	0.88
40 to 49	0.52	1.62	1.64	0.73
50 to 64	0.51	1.45	1.15	0.70
65 or more	0.44 *	0.77	0.98	0.49
Years of experience				
5 to 10 years	1.14	0.69	0.68	0.69 1.14
11 or more years	2.03 **	0.91	1.25	0.77 2.03
Level of education				
High school diploma	0.68 *	0.71	0.66	1.48
College/CEGEP/Trade school	0.80	0.82	0.98	1.72
Bachelor's degree	1.26	0.93	1.19	1.45
Master's degree or above	1.37	1.04	1.00	2.35 **
Growth expectation				
No growth	0.98	1.12	0.44 *	1.36
1–10% growth	1.31	1.91	0.44 *	1.93 *
11–20% growth	2.50 ***	3.95 ***	0.88	3.68 ***
20% or more	2.18 **	5.45 ***	1.83	4.84 ***
Firm size (ln no. of employees)	1.17 ***	1.24 ***	1.39 ***	1.31 ***
Young firms (<2 years old)	0.68 *	0.87	0.84	0.86
Gender of ownership				
Majority men	0.91	0.96	1.19	1.03
Majority women	0.65 *	1.28	0.46 **	0.79
Intensive SME exporters	1.81 ***	1.93 ***	1.62	2.40 ***
Pseudo R-squared	0.061	0.079	0.115	0.064
p-value	0.000	0.000	0.000	0.000

Table B-6: Antecedents of *organizational* innovation, by sector

	Goods producers	Wholesalers & Retailers	Professional, Scientific & Technical Services	Other Services
	E(ß)	E(ß)	E(ß)	E(ß)
Immigrant owner	1.27	1.00	0.99	1.21
Age of owner				
30 to 39	0.53	0.48	1.54	0.45 **
40 to 49	0.49 *	0.47 *	1.36	0.32 ***
50 to 64	0.40 **	0.35 **	1.98	0.33 ***
65 or more	0.43 *	0.28 **	1.97	0.29 ***
Years of experience				
5 to 10 years	0.96	1.45	2.22	1.19
11 or more years	0.85	1.41	1.61	1.66 *
Level of education				
High school diploma	0.81	1.08	0.58	1.21
College/CEGEP/Trade school	1.03	1.17	0.63	1.43
Bachelor's degree	1.05	1.16	1.00	1.25
Master's degree or above	1.38	1.81 *	1.00	1.63
Growth expectation				
No growth	1.16	0.82	1.01	1.57
1–10% growth	1.80 *	1.44	1.98	1.72 *
11–20% growth	2.22 **	2.57 ***	4.31 ***	3.38 ***
20% or more	3.43 ***	3.20 ***	3.93 **	4.76 ***
Firm size (ln no. of employees)	1.29 ***	1.31 ***	1.40 ***	1.36 ***
Young firms (<2 years old)	0.76	1.20	0.86	0.90
Gender of ownership				
Majority men	0.85	0.78	1.15	1.14
Majority women	0.91	0.94	0.62	0.96
Intensive SME exporters	1.27	1.11	1.43	2.32 **
Pseudo R-squared	0.051	0.056	0.98	0.061
p-value	0.000	0.000	0.000	0.000

Table B-7: Antecedents of *marketing* innovation, by sector

	Goods producers	Wholesale & Retail	Professional, Scientific & Technical Services	Other Services
	E(ß)	E(ß)	E(ß)	E(ß)
Immigrant owner	1.12	1.34 **	1.51 *	1.61
Age of owner				
30 to 39	0.88	1.02	2.03	1.14
40 to 49	0.90	0.82	1.12	0.77
50 to 64	0.90	0.85	1.57	0.90
65 or more	0.85	0.82	2.06	0.80
Years of experience				
5 to 10 years	1.03	1.16	5.43 ***	1.15
11 or more years	0.88	1.19	4.23 ***	1.56
Level of education				
High school diploma	0.88	1.63 *	1.00	0.73
College/CEGEP/Trade school	1.21	1.86 **	1.35	1.13
Bachelor's degree	1.74 **	2.66 ***	1.28	0.87
Master's degree or above	1.48	1.89 **	1.00	0.54
Growth expectation				
No growth	1.15	0.99	1.07	2.21
1–10% growth	1.87 *	1.55	2.32	2.65
11–20% growth	2.24 **	2.77 ***	3.08 *	7.54
20% or more	4.26 ***	4.21 ***	8.93 ***	7.64
Firm size (ln no. of employees)	1.14 ***	1.13 ***	1.28 ***	1.29
Young firms (<2 years old)	1.04	0.84	1.27	0.85
Gender of ownership				
Majority men	0.71 **	0.82	1.21	1.05
Majority women	0.96	1.33	0.61	1.33
Intensive SME exporters	1.35	1.11	1.29	2.11 **
Pseudo R-squared	0.050	0.048	0.099	0.080
p-value	0.000	0.000	0.000	0.000

Table B-8: Effect of SME owner and firm characteristics on *breadth* of innovation

ORDERED PROBIT REGRESSION (number of different types of innovation.)	
	Breadth
Variables	E(ß)
Immigrant	1.23 ***
Age of owner	<1.0 ***
Owner experience	>1.0 *
Level of education	>1.0 ***
Firm size (ln of number of employees)	1.16 ***
Age of firm	1.00 *
Majority women-owned	NS
Growth expectations	>1.00 ***
Intensive SME exporters	1.46 ***
Sector	Not available, suppressed
Whether or not a supplier to the federal government	1.21 ***

Sources: Statistics Canada, *Survey on Financing and Growth of Small and Medium Enterprises*, 2014; and Statistics Canada, Linkable File Environment. Coefficients significant at 0.01***, 0.05** and 0.10*, NS = not statistically significant.

MODELLING THE RELATIONSHIP BETWEEN SME SUPPLIERS AND EXPORTING

To investigate further the association between the likelihood of being a supplier to government and exporting, statistical models of the likelihood of exporting were estimated using a logistic regression approach. Two models were estimated in order to ensure robustness of the findings. In the first model, the dependent variable was a binary variable = 1 if the firm had exported at all, and = 0 if not. In the second model, the narrower definition of exporter was employed and set = 1 if the firm's export sales accounted for at least 25 percent of total revenues. Independent variables were as before. The results are shown in Table B-9.

Table B-9: Owner and firm characteristics associated with SME exporting

	LOGISTIC REGRESSION (exporter or not)	
	Some export sales	Export sales >25% of total revenues
Variavbles	**E(ß)**	**E(ß)**
Immigrant	1.40	1.81 ***
Age of owner	NS	NS
Years of management experience	>1.0 ***	>1.0 ***
Level of education	>1.0 ***	>1.0 ***
Firm size (ln of number of employees)	1.33 ***	1.20 ***
Growth expectations	>1.0 ***	>1.0 ***
Breadth of innovation	>1.0 ***	>1.0 ***
Sector		
Goods Producer	Reference	Reference
Wholesale & Retail	Note 1	Note 1
Professional, Scientific & Technical Services	Note 2	Note 2
Other services	Note 3	Note 3
Whether or not a supplier to the federal government	0.86 ***	0.60 ***

Sources: Statistics Canada, *Survey on Financing and Growth of Small and Medium Enterprises*, 2014; and Statistics Canada, Linkable File Environment.
Coefficients significant at 0.01***, 0.05** and 0.10*, NS = not statistically significant.
Note 1. In the Wholesale & Retail sectors, majority women-owned firms were significantly less likely to export than other firms.
Note 2. Firms in Professional, Scientific & Technical Services were significantly more likely to export than firms in other sectors.
Note 3. All firms in the Other Services sectors were significantly less likely to export than firms in other sectors.

MODELLING OBSTACLES TO CONTRACTING WITH THE FEDERAL GOVERNMENT

To further investigate the association among owner and firm-level characteristics and perceived obstacles to federal contracting, five logistic regressions were conducted. Each corresponded to one of the following obstacles as follows.

Model 1: Whether (=1) or not (=0) the SME had reported difficulty in finding contracting opportunities.

Model 2: Whether (=1) or not (=0) the SME had cited complexity of contracting process.

Model 3: Whether (=1) or not (=0) the SME had cited long delays in receiving payment.

Model 4: Whether (=1) or not (=0) the SME had cited difficulty providing all services required in contract.

Model 5: Whether (=1) or not (=0) the SME had cited difficulty meeting all contract requirements.

Independent variables were as used in previous modelling; results are shown in Table B-10.

Table B-10: Effect of owner and firm characteristics on perceived obstacles in selling to the federal government

	LOGISTIC REGRESSION (Obstacle cited or not)				
Variables	**Difficulty in finding contracting opportunities**	**Complexity of contracting process**	**Long delays in receiving payment**	**Difficulty providing all services required in contract**	**Difficulty meeting all contract requirements**
Control variables					
Immigrant	1.53 **	NS	NS	NS	NS
Owner's experience	NS	<1.0 **	NS	NS	NS
Level of education	NS	NS	NS	NS	NS
Firm size (ln of number of employees)	0.89 *	NS	NS	NS	NS
Age of firm	NS	NS	NS	NS	NS
Sector by gender					
Goods Producer					
Majority men-owned	(Reference category)				
Equally men/women-owned	0.74	1.48	NS, >1	NS, >0	NS, >1
Majority women-owned	2.28 *	2.03	0.40	2.27	1.41
Wholesale and Retail					
Majority men-owned	0.97	1.08	0.62 *	1.86 *	0.84
Equally men/women-owned	0.97	0.69	NS, <1	1.02	NS, <1
Majority women-owned	1.57	0.97	0.28 ***	2.82 **	0.45
Professional, Scientific & Technical Services					
Majority men-owned	1.86 **	1.78	E(ß)< 1 ***	NS, <1	NS, >1
Equally men/women-owned	NS>1	NS, <1	NS, <1	NS, >1	NS, >1
Majority women-owned	2.89 *	3.29 *	1.19	2.16	1.20
Other services					
Majority men-owned	0.87	0.76	0.78	0.88	0.71
Equally men/women-owned	NS<1	NS, <1	NS, <1	E(ß)< 1	NS, <1
Majority women-owned	0.41	0.65	0.69	0.15 **	0.81

Sources: Statistics Canada, *Survey on Financing and Growth of Small and Medium Enterprises*, 2014; and Statistics Canada, Linkable File Environment.
Coefficients significant at 0.01***, 0.05** and 0.10*

REFERENCES

Aidis, A., & Schillo, S. (2017). Gender, leadership and venture capital: measuring women's leadership in VC firm portfolios, *International Journal of Gender and Entrepreneurship*, 9(2), 110–135.

Alsos, G.A., Ljunggren, & R., Hytti, U. (2013). Gender and innovation: State of the art and a research agenda. *International Journal of Gender and Entrepreneurship*, 53, 236–256.

Appelt, S. & Galindo-Rueda, F. (2016). « Measuring the Link between Public Procurement and Innovation », *Documents de travail de l'OCDE sur la science, la technologie et l'industrie*, no. 2016/03, Éditions OCDE, Paris, http://dx.doi.org/10.1787/5jlvc7sl1w7h-en.

Aschhoff, B., & Sofka, W. (2009). Innovation on demand—Can public procurement drive market success of innovations? *Research Policy*, 38(8), 1235–1247. Accessed at https://www.oecd-ilibrary.org/docserver/5jlvc7sl1w7hen.pdf?expires=1523730594&id=id&accname=guest&checksum=14D01879048867E281884A5F468AE5AB

Breschi, S., Lassébie, J., and Menon, C. (2018). A portrait of innovative start-ups across countries", *OECD Science, Technology and Industry Working Papers*, No. 2018/02, OECD Publishing, Paris. http://dx.doi.org/10.1787/f9ff02f4-en.

Budget (2018). *Equity + Growth/ A Strong Middle Class*. Ottawa: The Government of Canada. Access at https://www.budget.gc.ca/2018/docs/plan/toc-tdm-en.html

Canada. A Nation of Innovators (2016). Access at https://www.ic.gc.ca/eic/site/062.nsf/vwapj/InnovationNation_Report-EN.pdf/$file/InnovationNation_Report-EN.pdf

Canadian *Taskforce for Women's Business Growth*. (2011). Telfer School of Management, University of Ottawa. Access at http://sites.telfer.uottawa.ca/womensenterprise/

Canada-U.S. Council for Advancement of Women Entrepreneurs and Business Leaders, 2017. Access at https://advancingwomeninbusiness.com

Chreim, S., Spence, M, Crick, D., Liao, X., (2018). Review of female immigrant entrepreneurship research: Past findings, gaps and ways forward. *European Management Journal*. 36(2), 210–222.

Cukier, W. (2017). *Immigrant Entrepreneurship: Barriers and Facilitators to Growth*. Toronto: The Diversity Institute. Access at https://www.ryerson.ca/content/dam/diversity/reports/ImmigrantEntrepreneur.pdf

Dheer, R.J.S. (2018). Entrepreneurship by immigrants: a review of existing literature and directions for future research. *International Entrepreneurship and Management Journal*, 1–60. Online March 2018, https://doi.org/10.1007/s11365-018-0506-7

Earl, L. (2016). *Science, Technology and Innovation: Challenges for Measurement and Analysis*. Presentation by Louise Earl, Section Chief, Investment, Science and Technology Division, Statistic Canada to the Telfer School of Management Research Seminar Series, Ottawa, November 25, 2016.

Edquist, C., Vonortas, N. S., Zabala-Iturriagagoitia, J. M., and Edler, J. (Eds.). (2015). *Public Procurement for Innovation*. Cheltenham, UK: Edward Elgar.

Ference Weicker & Company Ltd. (2008). *Impact Assessment of the Women Enterprise Initiative*, Western Economic Diversification Canada by 550-475 West Georgia Street Vancouver, BC, V6B 4M9. Also see *Women's Entrepreneurship in BC & Canada*, Women's Enterprise Centre (2014) and *Recommendations on a National Women's Enterprise Development Strategy to Drive Economic Growth*, Women's Enterprise Organizations of Canada (2016).

Glover, A. (2008). *Accelerating the SME Economic Engine: Through Transparent, Simple and Strategic Procurement*. Retrieved from: hm-treasury.gov.uk. London, UK: HM Treasury.

Harcourt, W. (2016). Introduction: Dilemmas, dialogues, debates, in: Harcourt, W. (Ed.), The Palgrave *Handbook of Gender and Development: Critical Engagements in Feminist Theory and Practice*. New York: Palgrave Macmillan, pp. 1–10.

Harris Rimmer, S. (2017). *Gender-smart Procurement. Policies for Driving Change*. London: Chatham House. The Royal Institute of International Affairs. Access at https://www.chathamhouse.org/publication /gender-smart-procurement-policies-driving-change

Harrison, R., Leitch, C. & McAdam, M. (2015). Breaking glass: toward a gendered analysis of entrepreneurial leadership, *Journal of Small Business Management*, 17(2), 693–713.

Henry, C., Orser, B., Coleman, C., Foss, L., (2017). Women's Entrepreneurship Policy: A 13 Nation Cross-country Comparison, *International Journal of Gender and Entrepreneurship*, 9(3), 206-228, https://doi.org/10.1108/IJGE-07-2017-0036

Innovation, Science and Economic Development (ISED, 2015). *Survey on Financing and Growth of Small and Medium Enterprises* (SFGSME), 2014. SME Research and Statistics of Innovation, Science and Economic Development Canada https://www.ic.gc.ca/eic/site/061.nsf/eng/029 97.html

International Trade Center (2014). *Empowering Women through Public Procurement*. Geneva. Cited in UN Women (2017), p. 40.

Karjalainen, K. & Kemppainen, K. (2008). The involvement of small- and medium-sized enterprises in public procurement: Impact of resource perceptions, electronic systems and enterprise size. *Journal of purchasing and Supply Management*, 14: 1–8.

Liao, D., Orser, B., & Riding, A. (2017). *Canadian Federal Procurement as a Policy Lever to Support Innovation and SME Growth, Telfer School of Management, University of Ottawa*. Access at telfer.uOttawa.ca/SMEprocurement

Loader, K. (2015). SME suppliers and the challenge of public procurement: Evidence revealed by a UK government online feedback facility. *Journal of Purchasing and Supply Management*, 21(2), 103–112.

Mancusi, M.L., Vezzulli, A., Frazzoni, S., Rotondi, Z., and Sobero, M., (2018). Export and Innovation in Small and Medium Enterprises: The Role of Concentrating Borrowing. *Economica*, 85, 177–204.

Miller-Kermani, D. (2009). *Women-Owned Small Business in the U.S.: Overcoming Hurdles in Federal Procurement*. (Master's Thesis). Florida Institute of Technology.

Neville, F., Orser, B.J., Riding, A.L., & Jung, O., (2014). Do Young Firms Owned by Recent Immigrants Outperform Other Young Firms?, *Journal of Business Venturing*, 29(1), 55–71.

OECD (2017). *Government at a Glance 2017*, OECD Publishing, Paris http://dx.doi.org/10.1787/gov_glance-2017-en

OECD and Eurostat (2005). *Oslo Manual: Guidelines for Collecting and Interpreting Innovation Data, 3rd Edition, The Measurement of Scientific and Technological Activities*, OECD Publishing, Paris.

Office of Small and Medium Enterprises and Strategic Engagement and Acquisition (OSMESEA, 2013). *Integral to the Economy, Integral to Procurement. 2012 Study of Participation of Small and Medium Enterprises in Federal Procurement*. Ottawa, CA: Office of Small and Medium Enterprises and Strategic Engagement and Acquisition, Canada. Retrieved April 28, 2017 from: https://buyandsell.gc.ca/sites/buyandsell.gc.ca/files /pwgsc_study-sme-federal- procurement_2012.pdf

Orlando C. Richard, Weichieh Su, Mike W. Peng & Carliss D. Miller (2015). Do external diversity practices boost focal firm performance? The case of supplier diversity, *International Journal of Human Resource Management*, 26(17), 2227-2247.

Orser, B., Riding, A., & Weeks, J., (2018). The Efficacy of Gender-Based Federal Procurement Policies in the United States. *Small Business Economics*, Access online https://doi.org/10.1007/s11187-018-9997-4

Orser, B.J., Kassun-Mutch, P., Elliott, C., Levine Ruben, R., (2016). Strengthening Ontario through Women's Enterprise. *Women Entrepreneurs Ontario (WEO) Collective*.

Orser, B.J., Riding, A.L., & Stanley, J., (2012). Perceived Career Challenges and Response Strategies of Women in the Advanced Technology Sector, *Entrepreneurship & Regional Development: An International Journal*, 24(1/2), 73–93.

Orser, B.J., Spence, M., Riding, A.L., Carrington, C., (2010). Gender and Export Propensity, *Entrepreneurship Theory and Practice*, 34(5), 933–957.

Public Services and Procurement Canada (PSPC, 2017). Procurement Key Statistics 2015–2016. Business Analytics Services Directorate (BASD), Procurement Business Management Sector (PBMS).

Ram, M., & Smallbone, D. (2003). Supplier diversity initiatives and the diversification of ethnic minority businesses in the UK. *Policy Studies*, 24(4), 187–204.

Rowe, A.M., (2016). *Designing Equality of Opportunity in National Innovation Systems Moving Towards Gender Conscious Policy, Performance Measurement, and Resource Allocation*. Doctoral Thesis, School of Graduate Studies, McMaster University, Canada. Accessed at https://macsphere.mcmaster.ca/bitstream/11375/20657/2/Rowe_Andrea_M_2016September_PhDPoliticalScience.pdf

Strohmeyer, R., Tonoyan, V., & Jennings, J. (2017). Jacks-(and Jills)-of-all-trades: On whether, how and why gender influences firm innovativeness. *Journal of Business Venturing*, 32(5), 498–518.

United Nations (UN) Women. (2017). *The Power of Procurement: How to Source from Women-owned Businesses. Corporate Guide to Gender-Responsive Procurement*. Access at http://www.unwomen.org/en/digital-library/publications/2017/3/the-power-of-procurement

United States Government Accountability Office (2014). *Women-owned Small Business Program Certifier Oversight and Additional Eligibility Controls are Needed*. Accessed at http://www.gao.gov/assets/670/666431.pdf

Wilson, F., Kickul, J., & Marlino, D. (2007). Gender, entrepreneurial self-efficacy, and entrepreneurial career intentions: Implications for entrepreneurship education. *Entrepreneurship, Theory and Practice*, 31(3), 387–496.

AUTHORS AND COLLABORATORS

JÉRÔME CATIMEL (M.A., M.Sc., Université Laval) manages the economic analysis unit of the Business Analytics Services Directorate (BASD). BASD is PSPC's Acquisition Program centre of expertise in procurement analytics and the authority for procurement data and reporting. Jérôme has held various positions with the federal government as economist and trade policy advisor in the areas of natural resources and the environment. Related experience includes applying economic theories to procurement in areas such as economic impacts, procurement efficiency and supplier participation.

QUANG P. DUONG obtained his PhD in Statistics from Western University and is currently an executive with Public Services and Procurement Canada (PSPC). He has extensive experience in leading complex projects, in particular the application of data analytics to provide innovative solutions to procurement, project management, performance and policy challenges. Before joining the federal government in 2006, he held positions in the private sector and taught at several Canadian universities.

DIANE (XIAOLU) LIAO is a M.Sc. graduate from Telfer School of Management, University of Ottawa. Her research interests revolve around the issues of entrepreneurship, more specifically in the innovation, internationalization, and gender issues of SMEs. Experience includes applying quantitative and qualitative methodologies to the assessment of public policies and programs.

BARBARA J. ORSER is a Full Professor and Deloitte Professor in the Management of Growth Enterprises. She is the author of over 100 publications focusing on gender, entrepreneurship and enterprise growth, and the co-author of *Feminine Capital. Unlocking the Power of Women Entrepreneurs* (Stanford University Press, 2015). Her current portfolio includes a multi-country research program examining women's enterprise policies, gender-sensitive entrepreneurial ecosystems and training curricula, and small business/ entrepreneurship policy.

See http://www.telfer.uOttawa.ca/en/directory/professors/orser-barbara

ALLAN L. RIDING is a Full Professor and Deloitte Professor in the Management of Growth Enterprises. This professorship was established to develop a better understanding of the business characteristics, strategies and environments that drive enterprise growth. Dr. Riding's primary research is the financing of SMEs. This work spans bank financing, SME loan-guarantee programs, angel and venture capital, and initial public offerings. Current research focuses on financial knowledge, discouraged borrowers, preferences for, and access to, financing sources for knowledge-intensive small firms, and financing impediments to international trade.

See http://www.telfer.uottawa.ca/en/directory/professors/riding-allan

RELATED TELFER PUBLICATIONS AND INITIATIVES

The Efficacy of Gender-Based Federal Procurement Policies in the United States
Orser, B., Riding, A., & Weeks, J., (2018)
Small Business Economics, Online
https://doi.org/10.1007/s11187-018-9997-4

Canadian Federal Procurement as a Policy Lever to Support Innovation and SME Growth
Liao, D., Orser, B. & Riding, A., (2017)
http://www.telfer.uottawa.ca/assets/documents/2017/Federal-Procurement-and-SMEs-report-Telfer_web.pdf

---

Strengthening Ontario through Women's Enterprise
Orser, B., Kassun-Mutch, P., Elliott, C. (2016)
Women Entrepreneurs Ontario (WEO) Collective
http://ontariowomensenterprise.weebly.com/

Feminine Capital. Unlocking the Power of Women Entrepreneurs
Orser, B., and Elliott, C. (2015)
Stanford University Press
https://www.amazon.ca/Feminine-Capital-Unlocking-Power-Entrepreneurs/dp/0804783799

Action Strategies to Support Women Entrepreneurs
Orser, B. (2011)
Canadian Taskforce for Women's Business Growth
http://sites.telfer.uottawa.ca/womensenterprise/

Procurement strategies to support women-owned enterprise
Orser, B., (2009)
Conducted behalf of WEConnect International Canada.
http://sites.telfer.uottawa.ca/womensenterprise/reports/

Canadian Women Entrepreneurs, Research and Public Policy: A Review of Literature
Orser, B. (2007)
Conducted on behalf of the Department Foreign Affairs and International Trade.
https://www.researchgate.net/publication/266405596_Canadian_Women_Entrepreneurs_Research_and_Public_Policy_A_Review_of_Literature

CONNECT WITH US

fb.com/telfer.uOttawa

@TelferResearch

@telfer_uOttawa

tlfr.ca/linkedin