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A longitudinal study of the characteristics, business creation process and outcome differences of Canadian female vs. male nascent entrepreneurs

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Abstract This paper concerns a longitudinal study, of a random sample of nascent entrepreneurs in Canada (based on an initial screening sample of 49,763 households). We study gender differences, including number and type of gestational activities, the characteristics of the business created, and the status of the start-up effort after the 4th year of data collection. Logistic regression is used to predict the creation of an operating business from gender and other variables. Four of nine gender difference hypotheses were supported. Findings show that women who are members of a start-up team are six times more likely to achieve an operating business.

Keywords Nascent entrepreneurs · Business start-up · Entrepreneurial teams

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The Global Entrepreneurship Monitor (GEM), which studies entrepreneurial processes across 35 countries, reports nascent entrepreneurial activity as varying greatly across countries (Minniti, Bygrave & Autio, 2005).[1,2] For example, some countries exceed a 10% nascent entrepreneurship rate (e.g., Venezuela 19%, Jamaica 11%), while others range from 5 to 10% (e.g., US 9%, Australia 7%, Canada 7%, China 6%), and some are below 5% (e.g., France 4.7%, Italy 3%, UK 3%, Germany 3%, Japan 1%). Regardless, however, of the rate of nascent entrepreneurial activity "Men are more likely to start a business than women. In no country are women more active in starting and owning businesses than men" (Minniti et al., 2005, p. 11). In Canada, between 1999 and 2004, the self-employment rate shows an increase of 0.3% for men and decrease of −0.5% for women (Statistics Canada, 2004). Furthermore, as of 2000 in Canada, only 15% of SMEs were led by a female entrepreneur, while men were lead entrepreneurs in 67% of SMEs. Furthermore, female-owned and led SMEs were reported to be smaller scale, with fewer employees, less often incorporated, had slower growth and were less inclined to exporting than male owned SMEs (Statistics Canada, 2002).[3] Unfortunately, research into women and entrepreneurship is sparse and underdeveloped (Baker, Aldrich, & Liou, 1997; Brush, 1992; Brush, Carter, Gatewood, Greene, & Hart, 2001, 2004; Menzies, Diochon & Gasse, 2004; Menzies & Tatroff, 2006), but then, so is research into nascent entrepreneurs.

Early attempts to study the venture start-up process involved model building (Cooper, 1970; Gibb & Ritchie, 1982; Greenberger & Sexton, 1988; Martin, 1984; Shapero, 1985) which was subsequently criticized for adopting a narrow theoretical perspective, attempting to develop "universal" theories, and for using flawed methodology (Gartner, 1985; Mason, 1989; Shane, Kolvereid & Westhead, 1991; Reynolds & White, 1997). The methodological criticisms are due to the reliance on retrospective information about the start-up process. The study of nascent entrepreneurs (NEs) was largely spearheaded by Reynolds (2000) to address methodological shortcomings and to build knowledge in an area about which little was known. For example, few studies report on the process of starting a business with real time data, also, owners of operating businesses can be located and interviewed, albeit retrospectively, but people in the process of starting a business, who subsequently abandon their efforts, are not easy to locate and have not been a focus of entrepreneurship research.

A group of international scholars, under the leadership of Reynolds (2000), initiated a large-scale study of NEs and the start-up process (Fig. 1), called the Panel Study on Entrepreneurial Dynamics (PSED).[4] The ERC conceptual framework, in part, is shown in Fig. 1, and contextualizes the variables we will examine in this study.

[1] For information on the GEM see http://www.gemconsortium.org.

[2] Nascent entrepreneurs are defined as those individuals who are actively engaged in the start-up process, but who have not yet achieved an actual firm birth (a viable business) (Reynolds, 2000).

[3] For a study of male and female Canadian entrepreneurs that reported contrary findings see Menzies et al. (2004).

[4] The Entrepreneurial Research Consortium (ERC) included researchers across many countries (US, Australia, Canada, Finland, Germany, Greece, Netherlands, Norway, Sweden, United Kingdom).

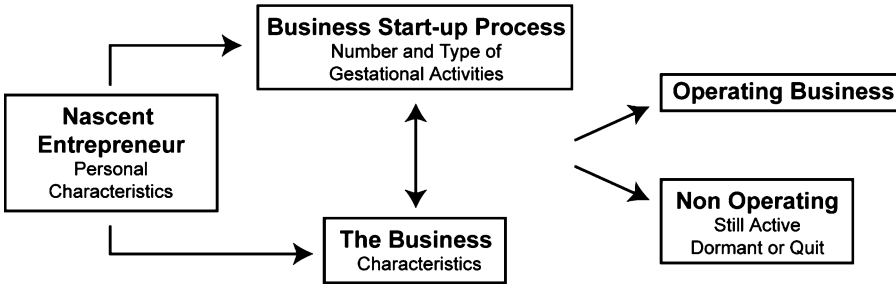

Fig. 1 Conceptual framework

In this paper we provide a theoretical background to assist with the development of our hypotheses. We explain our methodology and then present results examining the personal characteristics, gestational activities, business characteristics and outcomes of the start-up effort of a sample of Canadian nascent entrepreneurs in relation to gender.

Theoretical framework and hypotheses development

Personal characteristics

With regards human capital, it is well documented that women have a tendency to major at university in health-related subjects, while men are more predominant as science, computers and technology majors (Carter & Brush, 2004; Menzies et al., 2004). There are mixed results regarding growth expectations with one study finding a difference by gender (Schoett & Bager, 2004) whereby Danish male nascent entrepreneurs having higher growth expectations. A study by Matthews and Human (2000) found no gender difference in growth expectations amongst the US PSED respondents. A relationship was found between growth aspirations and start-up motives for female nascent entrepreneurs but not for men in the US PSED study (Cassar, 2004). The proposition that women are more prone to "fear of failure" (Wagner, 2004), has not been supported by GEM studies (Kollinger & Minitti, 2005). Although there are only limited findings, in this, as yet, under-researched area, we can hypothesize that based on these early results of PSED and GEM nascent entrepreneur studies:

H1 Nascent entrepreneurs will differ by gender according to university degree major.
H2 Growth expectations are higher for male nascent entrepreneurs than for female nascent entrepreneurs.

Gestational (Process) activities, business characteristics and outcomes

In a review of nascent entrepreneurship research, Davidsson (2006) summarized the gender findings as follows: "In essence the results indicate no differences in

outcomes; some rather small differences in process, and a marked and consistent difference in entry" (p. 37).[5] Davidsson & Honig (2003) analyzing the Swedish ERC data, found process variables or outcomes did not differ by gender, apart from a slightly lower number of months for business gestation for women compared to men.

Alsos and Ljunggren, (1998) found some gender differences, for example, that women were slightly less likely to prepare a formal business plan, but were significantly more likely to apply for government funding and were less likely to hire employees. GEM data indicate that the growth trajectory for female-led new business is less steep than that for male-led new businesses, with women generally expecting to hire fewer employees (Minniti, Arenius, & Langowitz, 2004). Davidsson and Honig (2003) tentatively suggested that women completed the gestational period more quickly than men, but the effect was slight. We thus hypothesize as follows:

> H3 Nascent entrepreneurs differ by gender according to completion of a formal business plan, with women less frequently completing a formal business plan.
> H4 Nascent entrepreneurs differ by gender according to their expectations of hiring employees, with women having lower expectations of employee hiring.
> H5 Nascent entrepreneurs differ by gender according to the length of the gestation period, with women taking a shorter time-frame to achieving an operating business.

Based on H5, we thus hypothesize;

> H6 Nascent entrepreneurs differ by gender according to the number of activities they complete during the gestation period, with women completing fewer, due to the shorter time-frame assumed in H5.

GEM findings indicate some gender differences in early-stage business characteristics. For example, businesses started by men used an average of $65,000 (US) start-up capital, but the average for women was only $33,000. The type of new business created has been found to vary according to gender, with women utilizing "known technology" and "targeting existing markets" (Minniti et al., 2004, p. 13), whereas Newbert (2005) found no gender effect according to type of business, whether hi-tech or not. We thus hypothesize that:

> H7 Nascent entrepreneurs will differ by gender according to the type of business created.
> H8 Nascent entrepreneurs will differ by gender according to the business target market.

There is no established position on whether human, social and financial capital variables influence the achievement of an operating business (Davidsson & Honig, 2003). Diochon, Menzies and Gasse (2003) reporting on the early stages of the PSED Canadian study as well as Parker and Belghitar (2004) and Newbert (2005) for the US PSED study, found no relationship between outcomes and gender. Based on these findings, we hypothesize that:

[5] An important issue is the "difference in entry", which is the lower incidence of female vs. male nascent entrepreneurs, however, we do not pursue this in this paper.

H9 There are no gender differences regarding the outcome of being able to achieve an operating business.

Methodology

The ERC longitudinal methodology was adopted for this research (Reynolds, 2000). The sample of Canadian nascent entrepreneurs was generated from an initial 49,763 randomly selected telephone numbers. Our unit of enquiry was the "household", and we limited our study to adults, 18 years of age and older. We ascertained that nascent entrepreneurs were present in 1.8% of households (margin of error less than 0.2%) as of 2000. Our stratified proportional sample is representative of all Canadian households from all provinces. We subsequently phoned and interviewed our respondents, yearly for five years, and also mailed surveys.[6]

In this study, respondents were asked in the four follow-up calls, whether the business was operating. By operating, it was meant that the business had to have been operating at a profit for a period of 6 months, including paying salary to the entrepreneur. This variable constitutes the major outcome of the study. Positive responses at time 4 or responses of those missing at time 4 but operating at time 3 were coded as operating, and all other responses were coded as not operating. As appropriate, *t* and *chi-square* tests were used to compare the answers of male and female respondents. Variables with relatively little missing cases were chosen for study. Following the lead of Davidsson and Honig (2003), an index of business gestation activities was formed from the variables listed in Table 2. As listed, all components were dichotomies, although some represented successive steps of a single activity, higher steps being weighted more heavily.[7] One activity, opening a bank account, was added. In this paper we used gestational activities as completed by the third year of the study. With the dichotomous outcome of whether or not an operating business was created, logistic regression was chosen as the basic statistical model. Variables were entered hierarchically, but for brevity of presentation only summary tables are presented below.

Results

Sixty-two percent (94) of respondents were male and 36% (54) were female. Table 1 shows descriptive statistics of the entrepreneurs. Table 2 illustrates the gestational activities undertaken by respondents with the mean number of activities completed being 15, with a minimum of 3 and a maximum of 30. The business characteristics are shown in Table 3. Although these results present interesting information about nascent entrepreneurs, the start-up process and the businesses, we do not discuss

[6] For a description of the survey methodology and overall study results, see Diochon, Menzies & Gasse (2003, 2004, 2005a, 2005b); Gasse, Diochon and Menzies (2004); Menzies, Gasse, Diochon, and Garand (2002).

[7] A few activities which were included by Davidsson and Honig (2003) were not asked about in the current study and could not be included in the total.

Table 1 Personal characteristics of entrepreneurs

	N	%	% Yes	Mean	S.D.
Age of respondent	139	–	–	41.09	10.68
University education	151	–	44	–	–
Marital status	151	–	68	–	–
Are you working for others for pay?	148	–	49	–	–
Years of work experience					
0–12	47	31			
12–24	50	33			
25+	54	36	–	–	–
Total revenues of the household?	123	–		6.38	3.42
Are you the owner of the residence you live in?	149	–	63	–	–
What percentage of household or child tasks do you do?	142	–	–	57.75	33.30
Parents operated a business	151	–	31	–	–
Business ownership among other relatives or kin, apart from parents:					
Most	16	11	–		
Some	48	32			
Few	50	34			
None	34	23		–	–
Business ownership among close friends and neighbors:			–		
Most	17	12			
Some	50	34			
Few	56	39			
None	22	15		–	–
Previous startup experience?	151	–	44	–	–
Member of a startup team?	151	–	48	–	–
Made contact with a helping program?	151	–	42	–	–
On average, how many hours per week do you devote to the business?	143	–	–	36.87	39.52
Expected percentage of ownership in 5 years	141	–	–	74.02	30.43
What is the probability that this business will become the major source of your family's income?	144	–	–	64.90	33.58
What is the likelihood that this business will be operating five years from now?	142	–	–	82.34	24.28
Preference on the future size of the business	145	–	15	–	–

these results in this paper, but present them here for information purposes and to show the variables we utilized in our analysis.

Gender differences

The differences between our male and female nascent entrepreneurs are presented in Table 4. We found support for H1 (Nascent entrepreneurs will differ according to university degree major), as there were significant differences for area of university education, with men more concentrated in applied science and computers, and women more often majoring in health related subjects. Not unexpectedly, females reported performing a higher percentage of household tasks than did males. H2 (Growth expectations are higher for male nascent entrepreneurs than for female nascent entrepreneurs.) was supported, at least partially, in that males estimated a higher probability that their business would be operating in 5 years. In addition, males had more startup experience, were more likely to own their home, and had more friends and neighbors with businesses.

Table 2 Nature and distribution of business gestation activities

Activity	% Endorsing
Business Plan is started, not yet complete	8
Business Plan is in progress	22
Business Plan is complete	51
Product development is an idea	8
Product development is a model	10
Product development is a prototype	9
Product development is ready for sale	70
Marketing is underway	71
Hold copyright, not registered	9
Hold copyright, registered	15
Business purchases have been made	83
Major business purchases have been made	54
Have approached customers, researched competition	89
Have prepared projected financial statements	59
Saving money to invest in the business	54
Approached people/banks for funds: initiated	5
Approached people/banks for funds: completed	35
Have engaged home help	23
Work 35 hours per week or more on business	56
Have part-time employees	16
Have 1 full-time employee	4
Have 2 full-time employees	4
Have 3 or more full-time employees	13
Have hired non-owner employee(s)	25
Business has a separate phone listing	48
Has taken a business class	44
Business has independent premises	17
Business has a separate bank account	64
Business has filed a federal tax return	48

We found no support for H3, that nascent entrepreneurs differ by gender according to completion of a formal business plan. H4, that nascent entrepreneurs differ by gender according to their expectations of hiring employees, was also not supported. H5, that nascent entrepreneurs differ by gender according to the length of the gestation period, was also not supported. We found no support for H6 as there was no difference between the total number of gestational activities completed by male and female entrepreneurs.

Of the component activities there were significant differences only on two. Women were significantly less likely than men, to have a copyright for materials used in their business, at 6% and 21% respectively ($\chi^2(2) = 7.89$, $p < 0.05$). Whether the business was reported to be high tech differed between male and female entrepreneurs, supporting to some extent H6 (Nascent entrepreneurs will differ by gender according to the type of business created). In addition, women (37%) also were significantly less likely to have a dedicated phone line for the business than were men (84%), ($\chi^2(1) = 4.07$, $p < 0.05$). Of the variables describing the nature of the business, two pertaining to the geographical range of activities and target market were significant. Women estimated that a higher percentage of their customers would be local than did men, while men estimated that a higher percentage of their

Table 3 Business characteristics

	N	%	% Yes	Mean	SD
Type of industry:					
Manufacturing, extraction	32	22			
Retail, Wholesale	35	24			
Technical and management services	42	28			
Other Services	40	27			
Source of Expected Customers (Percentage)					
Local	143			57.27	36.98
Regional	138			21.17	26.90
National	134			12.87	22.27
International	134			16.52	30.70
Product or Service Information:					
Was the product on the market 5 years ago?	151		68		
Spending on R & D a high priority	151		39		
Company is high tech	151		27		
Competitive pressure to get product to market	151		55		
Ownership composition					
Solo	98	65			
With spouse only	25	17			
With others	28	19			
Operation status:					
Operating at time 3 or 4	33	22			
Not operating at time 4	118	78			

customers would be international (Table 4), thus supporting H7 (Nascent entrepreneurs will differ by gender according to the business target market).

Regarding outcomes, the creation of an operating business, the difference between males and females was not significant, but there was a trend. Women were somewhat more successful in creating operating businesses ($\chi^2(1) = 3.64$, exact one-sided $p = 0.08$). Thus we found an indication that H8 (there are no gender differences regarding the outcome of being able to achieve an operating business), though supported, requires further investigation.

Predicting the creation of an operating business

With special interests in gender of entrepreneur and in gestational activities, our first model used those two variables and the interaction to predict the outcome. It was found that the best model included only gender and gestational activities (G3) with results as follows (Table 5). This model is significant ($\chi^2(2) = 19.18$, $p < 0.001$).

It is interesting to note that gender, when entered on step 1 was not significant, and became so only when G3 was added to the model. When the interaction was subsequently added the step did not explain significant variance. The Nagelkerke R Square statistic for this model was 0.19. Having established this basic prediction model, we wished to find variables which either directly or in interaction with gender, would increase the prediction of operating outcome. Variables were entered with gender on step one, G3 added on step 2, and the interaction between gender and each variable on step 3. Since the interaction of G3 and gender was not significant in

Table 4 Personal and business characteristics with gender differences

	% Male	% Female	Total	*N*	Mean	SD
College or University Major:**						
Administration, Accounting, Math	24	33	27			
Health and Natural Sciences	10	24	15			
Applied Sciences and Computers	32	4	22			
Education, Social Services, Arts	20	15	18			
None/Other	15	24	18			
Are you the owner of the residence you live in? *Yes	70	54	64			
What percentage of household or child tasks do you do? ***						
Male				87	47.6	32.0
Female				53	74.7	27.4
Business ownership among close friends and neighbors:						
Most**	14	8	12			
Some	31	41	35			
Few	46	25	39			
None	9	25	15			
Previous startup experience? **Yes	54	28	44.6			
None	46	72	55.4			
What is the like hood that this business will be operating five years from now?*						
Male				88	85	21.4
Female				51	76.0	28.0
Company is hi-tech: No or Not Applicable**	65	85	72			
Yes	35	15	28			
Source of Expected Customers (Percentage)**						
Local: Male				87	49.8	38.3
Female				53	70.2	32.1
International: Male				82	21.4	35.3
Female				50	7.6	17.0

Note: $p < 0.05$*, $p < 0.01$**, $p < 0.001$***

the model below, it was not entered in subsequent models. None of the personal variables added significant prediction to the model (Table 5). Of the business variables, the interaction of gender and being a member of a startup team added significantly to the model which was significant ($\chi^2(4) = 23.16$, $p < 0.001$) (Table 6). In this model the direct effects of neither gender nor startup team was significant. G3 was significant, and when the interaction was added to the model, the step test was significant ($\chi^2(1) = 3.86$, $p < 0.05$). The Wald test is also significant for the interaction term. It would appear that when G3 is controlled, being a woman as well as a member of the startup team increases the odds of success by a factor of almost

Table 5 Predicting the creation of an operating business from gender and other variables

		B	S.E.	Wald	*df*	Sig.	Exp(*B*)
Step 1[a]	gender(1)	0.928	0.440	4.442	1	0.035	2.528
	gestatn3	0.151	0.040	14.032	1	0.000	1.163
	Constant	−4.078	0.791	26.564	1	0.000	0.017

Note: [a] Variable(s) entered on step 1: gestatn3.

Table 6 Predicting the creation of an operating business from gender and other variables

	B	S.E.	Wald	*df*	Sig.	Exp(*B*)	95.0% C.I. for EXP(*B*)	
							Lower	Upper
starteam(1)	−0.91	0.59	2.35	1	0.13	0.402	0.13	1.29
gender(1)	0.17	0.59	0.08	1	0.77	1.18	0.37	3.73
gestatn3	0.17	0.04	15.47	1	0.00	1.18	1.09	1.23
gender(1) by starteam(1)	1.75	0.90	3.73	1	0.05	5.74	0.98	33.78

6. The Nagelkerke *R* Square statistic for this model is 0.22 and the Hosmer and Lemshow test of fit is good at 0.58. Follow-up contingency table testing shows that there is a strong relationship between gender and success in establishing an operating business ($\chi^2(1) = 4.45$, $p < 0.05$) for those who were members of a startup team, but no relationship among those who were not. Thus, team membership seems to benefit women more than men.

Summary and conclusion

Our paper presents an exploratory longitudinal study of a random sample of Canadian nascent entrepreneurs. We examined the differences between male and female personal characteristics, gestational activities and the ability to achieve an operational business. We tested nine hypotheses which were generated from the early-stage research into this relatively new research stream of nascent entrepreneurship and the results are summarized in Table 7. We ascertained that male and female nascent entrepreneurs differ according to university degree major. We also found that males tend to have greater growth expectations and started businesses more frequently that were hi-tech. Female nascent entrepreneurs tended to expect to do business more with local clients than men who had higher expectations of doing business internationally. We did not find any evidence to support gender differences in relation to completion of a formal business plan, a greater likelihood to hire employees, or different duration of gestational activities.

In sum, there appear to be few differences between male and female nascent entrepreneurs. Among the many personal characteristics which were compared, only a few were significantly different (Table 4). The differences that do exist, we tentatively suggest, point to male nascent entrepreneurs having more factors that lead to confidence building. For example, owning a home, being less burdened by household or childcare task, having friends and neighbours who own businesses, having previous start-up experience, expecting that the business will be around in 5 years, having a hi-tech business and expecting to trade internationally are all factors that could be construed as contributing to enhanced self efficacy, networking opportunities and time to work on the start-up. Despite these differences between men and women, there is no significant difference in the likelihood between men and women of achieving an operating business. There is a slight tendency that shows women may be more likely to more frequently achieve an operating business.

Table 7 Hypotheses: Results of testing

No.		Supported	Not supported
H1	Nascent entrepreneurs will differ by gender according to university degree major.	X	
H2	Growth expectations are higher for male nascent entrepreneurs than for female nascent entrepreneurs.	X	
H3	Nascent entrepreneurs differ by gender according to completion of a formal business plan, with women less frequently completing a formal business plan.		X
H4	Nascent entrepreneurs differ by gender according to their expectations of hiring employees, with women having lower expectations of employee hiring.		X
H5	Nascent entrepreneurs differ by gender according to the length of the gestation period, with women taking a shorter time-frame to achieving an operating business.		X
H6	Nascent entrepreneurs differ by gender according to the number of activities they complete during the gestation period, with women completing fewer, due to the shorter time-frame assumed in H5.		X
H7	Nascent entrepreneurs will differ by gender according to the type of business created.	X	
H8	Nascent entrepreneurs will differ by gender according to the business target market.	X	
H9	There are no gender differences regarding the outcome of being able to achieve an operating business.	X	

In terms of predicting who will be able to achieve an operating business, we found that women who were members of a start-up team were significantly more likely, in fact six times more likely, to achieve an operating business. This is an important finding which has implications for a range of stakeholders. For example, practitioners, educators and policy makers can work to find ways to facilitate team building and through this, directly or indirectly, encourage team starts.

Our study attests to the largest predictor of operating success being good preparation, as represented by the number of gestational activities completed. Only when the number of gestational activities completed is controlled statistically is there a significant difference between women and men which predicts operating success, and more for women who are members of a team.

The limitations of this study are the small size of the sample, and the relatively small number of respondents whose businesses reached operating status. Future studies need to include more respondents so that more subtle predictive relationships may be studied. Furthermore, we aim to study the nature of the teams that our nascent entrepreneurs were part of. We are in the early stages of work on nascent entrepreneurship, but the findings of this study have identified two directions, in particular, for future research, namely nascent entrepreneurial teams and confidence factors as mediated by gender.

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