

Gender Differences in Founders' Social Network Development

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ABSTRACT

Drawing upon social networking theory, this study examined gender differences in SME founders' social network development. Multiple waves of data collection were conducted on a sample of approximately 1400 SMEs in the U.S. The statistical analysis found gender differences in founders' utilization of social relations to expand businesses and profiled female entrepreneurs' social networking strategies in business expansion. Compared with male entrepreneurs, female entrepreneurs establish weaker research ties at the start-up stage and stronger business and political ties at the expansion stage. The research findings contribute to knowledge about female entrepreneurs and their business development. Female entrepreneurs react against social barriers by actively networking in male-dominated business environments at both the business start-up and expansion stages. Female entrepreneurs are encouraged to network actively to establish and develop various social relationships that would enable them to access crucial resources for business creation and expansion.

Key Words: Social network, Female entrepreneurs, Gender difference, Founders, SMEs

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INTRODUCTION

Women-owned enterprises, the majority of which are small businesses, are the fastest growing sector in the US economy. Women owned approximately 30% of U.S. businesses in 2007, and 90% of women-owned firms were small businesses (U.S. Census Bureau Statistics, 2007). In the U.S., the number of women-owned enterprises grew 44% versus 22% for male-owned firms during the period from 1997 to 2007 (Economics and Statistics Administration, 2010). However, disparity between men and women as business owners still exists in many countries (Allen, 2007). In Western countries, men are almost twice as likely as women to participate in early stage entrepreneurship or to own established businesses (Allen, 2007). In the U.S., women-owned firms generated only 4% of all business-related revenues in 2009, and men were twice as likely as women to own a business with revenues over \$1 million (Center for Women's Business Research, 2009). Men are three to four times as likely as women to start new ventures (O'Reilly and Hart, 2003). Compared with businesses owned by men, women-owned businesses are younger and smaller in size (Lerner, 1997; Verheul and Thurik, 2001), have a lower growth rate (Brush, 1992; Chaganti and Parasuraman, 1996; Fabowale, 1995) and have lower profits (Carter, Williams and Reynolds, 1997). Further understanding of gender differences in entrepreneurship can help to guide and support female entrepreneurs and women-owned enterprises.

This study attempts to examine gender differences in SME founders' social network development. Entrepreneurship is inherently a networking activity (Dubini and Aldrich, 1991), and the founder's capability in developing and managing social networks is a factor in the success of a new venture (Leyden and Link, 2015; Xu, 2016). A few studies have explored female entrepreneurs' networking activities at different stages (Hampton et al., 2009). However, little is known about gender differences in entrepreneurs' social network development. This research aims to fill this gap in the entrepreneurship literature.

The specific research question is what gender differences exist in founders' social ties at the start-up and expansion stages. Drawing upon representative works on female entrepreneurship and social capital, a series of hypotheses were developed and tested. The methodology and data analysis are presented, followed by a discussion of the results.

LITERATURE REVIEW

An emerging research stream has paid increased attention to female entrepreneurs since the 1980s (Moore and Buttner, 1997; Walker and Webster, 2007). One research area is the role of gender in entrepreneurs' social networking activities. Social networks have significant impacts on the performance of new ventures (Baum, Calabrese and Silverman, 2000; Stuart, 2000), since entrepreneurs access and use the resources embedded in their social networks (DiMaggio and Powell, 1983; Granovetter, 1985; Lin, 2001). Social linkages improve individuals' ability to access each other's knowledge (Nahapiet and Ghoshal, 1998) because knowledge is distributed in social relations (Brown and Duguid, 2000; Hayek, 1945). One important competency of a founder is the ability to develop and manage effective networks to create and grow new ventures. Gender differences exist in entrepreneurs' approach to network establishment and development (Buttner, 1993; Davis and Long, 1999); women participate in fewer business networks (Brush, 1992; Orhan, 2001) and spend less time on developing their

social networks (Cromie and Birley, 1992). Women's social networks are limited in size, density, range and tie strength (Granovetter, 1982; Ibarra, 1993; Knouse and Webb, 2001). As a result, female entrepreneurs may be at a disadvantage in gaining knowledge and accessing resources through social ties (Morgan and Hunt, 1994; Okanlawon, 1994). For example, women's less effective operation of their social networks could undermine their ability to obtain loans (Coleman, 2000).

However, some research suggests that women make greater use of their social networks in entrepreneurship (Aldrich and Zimmer, 1986; Greve and Salaff, 2003; Yetim, 2008). Women's limited access to formal business networks (Katz and Williams, 1997) drives them to build stronger relationships with their informal connections, including family members and friends (Aldrich, 1989; Brush, 1992; Ibarra, 1993; Neider, 1987). This means that women tend to establish social contacts proactively to expand their businesses. Women deliberately network by targeting specific individuals ((Aldrich, 1997; Carter, 2001; Starr and Yudkin, 1996) and by developing reciprocal and collaborative relationships (Buttner, 1993; Martin, 2001). Previous studies have stressed the differences in social networks between male and female business owners (Farr-Wharton and Brunetto, 2007; Hampton, Cooper and McGowan, 2009; Klyver and Terjesen, 2007; Kwong, Thompson, Jones-Evans and Brooksbank, 2009; Malewicki and Leitch, 2011; Yetim, 2008). We need to better understand how successful female entrepreneurs react against social barriers to business creation and expansion. This paper is intended to clarify the conflicting findings of previous studies and help us understand how female entrepreneurs make use of their social connections to expand their businesses.

HYPOTHESES DEVELOPMENT

At the start-up stage, founders develop a business plan, plan for business operation, obtain funding to begin product/service development, and launch their businesses. They build social ties at this stage to exploit business opportunities. A network of relationships helps the nascent entrepreneurs to overcome the resource deficiencies characteristic of the early stage of a SME (Newbert and Tornikoski, 2010). Founders can broaden their resource base by tapping into disparate pools of knowledge (Kreiser, Patel and Fiet, 2013; Obstfeld, 2005). Their various social ties can be grouped into three categories: (1) research ties defined as social ties with the scientific community, such as researchers in universities, research institutes and government labs; (2) business ties defined as social relationships with business players, such as customers, suppliers, private banks, and other market partners; and (3) political ties, which refer to social connections with officials in central and local governments. Tie strength is an important characteristic of social relationships (Granovetter, 1973); strong ties involve frequent interaction and reciprocity and a high level of emotional closeness. Founders need to spend significant amounts of time, effort, and resources to develop and maintain strong-tie relationships (Adler and Kwon, 2002). This may limit their ability to develop new contacts, which can in turn cause them to excessively rely on their strong ties and limit their access to new ideas and resources (Uzzi, 1997). A large network of weak ties facilitates the exchange of non-redundant resources (Burt, 1992; Granovetter, 1973). Founders with limited resources need to expand their networks to acquire diverse resources and information.

Table 1: Selected Survey Items

Survey Items to Construct the Entrepreneur's Social Ties at Two Stages:			
a. Social Ties Prior to Startup			
Please think back to the period just prior to the launch of your business, when you were developing your business plan, planning for your product/service, and seeking funding and potential clients. You may have sought different people to discuss your business ideas, obtain feedback and other information, and receive support. Please indicate in each cell how many people in each position helped you with the business startup at that time.			
	Relatives	Friends	Acquaintances
1. Professionals in universities, research institutes and government labs	___	___	___
2. Professionals in trade associations and industry associations	___	___	___
3a. Managers of large banks, venture capital firms or other financial institutions	___	___	___
3b. Other staff members of large banks, venture capital firms or other financial institutions	___	___	___
4a. Managers of medium and small banks, venture capital firms or other financial institutions	___	___	___
4b. Other staff members of medium and small banks, venture capital firms or other financial institutions	___	___	___
5a. Owners or managers of large firms in your own industry	___	___	___
5b. Other staff members of large firms in your own industry	___	___	___
6a. Owners or managers of medium and small firms in your own industry	___	___	___
6b. Other staff members of medium and small firms in your own industry	___	___	___
7a. Owners or managers of large firms in different industries	___	___	___
7b. Other staff members of large firms in different industries	___	___	___
8a. Owners or managers of medium and small firms in different industries	___	___	___
8b. Other staff members of medium and small firms in different industries	___	___	___
9a. High-rank official in local governments	___	___	___
9b. Middle- and low-rank official in local governments	___	___	___
10a. High-rank official in ministries and agencies	___	___	___
10b. Middle- and low-rank official in ministries and agencies	___	___	___
b. Social Ties during the Expansion Period			
After the successful launch of your company, you may have sought to expand your company; for example, developing business and new products, increasing the size of company and number of clients. Please indicate how many people in each position helped you during this expansion period. (The same table is listed below.)			

Both the discriminatory effect and feminine profile limit women's ability to develop strong social ties with the scientific community. Female entrepreneurs are heavily underrepresented in high-technology industries (Hampton et al., 2009). This male-dominant business world discriminates against female entrepreneurs (Adler, 2002). Female entrepreneurs have limited access to male-dominated social networks and social organizations (Gamba and Kleiner, 2001; Knouse and Webb, 2001; Linehan, 2001); for example, female entrepreneurs are often excluded from informal networks in scientific spinout companies (Rosa and Dawson, 2006). Female entrepreneurs' characteristics may also constrain their choices and business decisions. They may lack self-confidence, experience anxiety about discrimination and become concerned about the amount of time and effort required to establish and maintain social networks (Smeltzer and Fann, 1989). In addition, men and women differ in their perceptions of their own abilities; women tend to perceive that, compared with men, they have stronger social and interpersonal skills (Hisrich and Brush, 1984) but weaker financial skills (Brush, 1992; Chaganti, 1986) and technological know-how and skills (Verheul and Thurik, 2001). As a consequence of female entrepreneurs' difficulty in establishing strong social ties with the scientific community, they tend to build weak research ties for accessing critical information and knowledge of new technologies.

Hypothesis 1: Female entrepreneurs tend to build weak research ties at the start-up stage.

At the expansion stage, founders develop new products and increase the size of their company and their number of clients. They build social ties to access valuable resources and learn critical skills for their business success. Women's lack of access to business networks (Adler, 1993) means that they need to be more active in building and developing business contacts in order to create and expand their businesses (Junquera, 2011). For instance, immigrant female entrepreneurs may react against these barriers by establishing wider social networks through their communities and family networks (Collins and Low, 2010; Yetim, 2008). In addition, women generally have less business experience than men (Fischer, Reuber and Dyke, 1993). Only a small number of women business owners have business experience before starting a new business (Audretsch, 2012; Bowen and Hisrich, 1986). Women entrepreneurs need to establish various social ties more proactively to make up for their lack of business experience.

Women are found to be better than men at establishing communication, convincing others, and providing solutions for interpersonal problems (Eagly and Johnson, 1990; Ufuk and Ozgen, 2001). Women's networks often consist mainly or exclusively of women (Aldrich, 1989). Women entrepreneurs may think and act differently from their male counterparts (Reed, Storrud-Barnes and Jessup, 2012; Safarik, Wolgemuth and Kees, 2003). Female entrepreneurial networks evolve during the various stages of the business life cycle. As firms mature, women owners became aware of the need to develop high-quality and diverse social relationships to acquire more assets (Granovetter, 1982; Hampton et al., 2009; Ibarra, 1993; Knouse and Webb, 2001), and may increase their effort to expand their businesses in male-dominated business environments. Government agencies provide incentives and support for women to start new businesses; for example, the Women's Business Act 1988 aims to support women-owned enterprises in the U.S. and, as a result, female entrepreneurs often attempt to establish strong business and political ties at the expansion stage.

Hypothesis 2a: Female entrepreneurs tend to build strong business ties at the expansion stage.

Hypothesis 2b: Female entrepreneurs tend to build strong political ties at the expansion stage.

METHODOLOGY

Sample and Survey Design

Multiple waves of data collection were conducted on a sample of approximately 1400 SMEs in three U.S. states. The mailing list was generated from the Hoover's Company Database, using the following procedure. First, only U.S. firms with fewer than 500 employees were included. Second, non-independent ventures, such as subsidiaries, business divisions, or conglomerate units, were eliminated. Finally, companies in multiple industries were included in order to increase the sample size and the generalizability of the findings. The industries include high-technology industries (e.g., biotechnology, nanotechnology, computer software, semiconductor) and non-high-technology industries (e.g., consumer products manufacturing, electronics, industrial manufacturing).

The original questionnaire was revised based on feedback from industry experts and two pilot tests. The respondents in the pilot studies, business owners of local technology firms, were excluded from the mail survey. To encourage participation and increase the validity of the responses, the introductory script of the questionnaire emphasized the potential benefits of this project to the entrepreneurs themselves. A paper questionnaire was mailed to the owner of the firm and followed up with telephone calls. After several waves of surveys and telephone interviews, 85 firms completed the full six-page questionnaire. No evidence of non-response bias was found in results of the Mann-Whitney test.

Variables Operationalization

The position generator method was used to capture the founder's social ties. This methodology captures occupational or positional characteristics of a person's social connections and enables one to collect data on strong and weak ties simultaneously (Lin, Fu and Hsung, 2001). As a common method in social science studies, it allows respondents to summarize their social contacts in each occupation and report the tie strength simultaneously. This method is theoretically meaningful because a person's occupation indicates his/her social resources, and entrepreneurs connected to people in different occupations can access various kinds of knowledge and other resources. These social ties are critical to the entrepreneur's ability to seek advice, obtain funding, establish cooperative relationships, and promote products or services.

The questionnaire asked respondents to identify their social relations at the SME's start-up stage and expansion stage. Under the question, a table was presented in which 18 types of occupations are listed in rows, and three types of tie strength (Relatives, Friends, Acquaintances) are placed in columns (Lin and Dumin, 1986; Lin et al., 2001). Respondents were asked to indicate how many people were in each cell. The exact wording of this survey item is given in Table 1. Eighteen types of occupations in three

categories were developed based on the results of numerous previous studies (Batjargal, 2003; Belliveau, O'Reilly and Wade, 1996; Lin and Dumin, 1986):

- (1) Research ties: Professionals in universities, research institutes and government labs;
- (2) Business ties: Professionals in trade associations and industry associations; managers or other staff members of large banks, venture capital firms or other financial institutions; managers or other staff members of medium and small banks, venture capital firms or other financial institutions; owners or managers or other staff members of large firms in your own industry; owners or managers or other staff members of medium and small firms in your own industry; owners or managers or other staff members of large firms in different industries; owners or managers or other staff members of medium and small firms in different industries
- (3) Political ties: High-, middle- and low-rank officials in local governments; High-, middle- and low-rank officials in ministries and agencies.

Tie strength was measured via emotional closeness (Granovetter, 1973; Marsden and Campbell, 1984). Ties were categorized as strong (i.e., relatives and friends) or weak (i.e., acquaintance) ties. The number of weak ties and the number of strong ties were then counted for each type of occupation. The measure of strong research ties was normalized by calculating the ratio of strong research ties to total number of social ties. A relatively high ratio indicates that the entrepreneur's social ties concentrate on strong connections with the scientific community.

$$SR_{Strong\ Research\ Ties} = \frac{Strong\ Research\ Ties}{Total\ Number\ Of\ Social\ Ties}$$

The measures of weak research ties, strong business ties, weak business ties, strong political ties and weak political ties were normalized in the same way, as the ratio of weak or strong social ties in each category to the total number of social ties of the entrepreneur.

Control Variables

In the questionnaire, respondents were asked to report age, level of education, level of involvement in social activities, length of working experience, level of ownership, and startup experience. Numerous studies have shown that these factors play significant roles in new venture innovation. The level of involvement in social activities is particularly noteworthy. Because the respondents were asked to report their business ties, it was essential to control for their level of participation in social activities at the aggregate level. The following question was asked to obtain data on the level of involvement in social activities: Are you a member of any organization/club/group? If yes, please indicate the level of involvement (minimal, regular or heavy) for each organization/club/group (professional association, trade association, alumni association, athletic club, political party, religious group, and others). In addition, the questionnaire asked respondents to report the new venture's industry, history, size, founding team size and alliances with other firms. A dummy variable was used as a control for differences between high-technology industries (1) and non-high-tech industries (0).

Table 2: Pearson Correlations^a

Variable	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1 Strong research ties (start-up)	0.08	0.15																							
2 Weak research ties (start-up)	0.09	0.14	0.02																						
3 Strong business ties (start-up)	0.21	0.22	-.25*	-.25*																					
4 Weak business ties (start-up)	0.36	0.22	-.38**	-.24*	-.60***																				
5 Strong political ties (start-up)	0.01	0.04	-0.07	-0.07	0.07	-0.14																			
6 Weak political ties (start-up)	0.04	0.09	-0.06	-0.05	-0.12	-0.10	.235*																		
7 Strong research ties (expansion)	0.06	0.19	.59**	0.17	-0.08	-0.32	-0.07	-0.11																	
8 Weak research ties (expansion)	0.08	0.17	0.00	.78***	-0.05	-.355†	-0.10	-0.15	-0.14																
9 Strong business ties (expansion)	0.12	0.20	-0.19	-0.20	.59**	-0.31	0.10	-0.17	-0.18	-0.01															
10 Weak business ties (expansion)	0.45	0.26	-0.29	-.48*	-0.26	.65***	-0.03	0.21	-.51**	-.48*	-.48*														
11 Strong political ties (expansion)	0.07	0.16	-0.15	-0.20	.45*	-0.19	-0.10	-0.17	-0.14	-0.09	.89***	-.38†													
12 Weak political ties (expansion)	0.22	0.23	-0.21	-0.30	-0.13	.370†	-0.10	0.17	-0.29	-0.28	-.26	.55**	-0.17												
13 Gender	1.08	0.28	-0.13	0.13	0.13	-0.04	-0.09	-0.16	.34†	-0.18	0.20	-0.31	0.20	-.35†											
14 Industry dummy	0.57	0.50	.30**	0.17	-.20†	-0.04	-.20†	-0.02	0.15	-0.10	-0.07	-0.03	-0.05	0.16	-.26*										
15 Firm size	51.35	95.130	0.10	-0.15	0.05	-0.02	-0.12	-0.13	-0.10	-0.09	0.33	-0.05	0.27	-0.06	-0.14	0.16									
16 Firm history	15.56	6.83	0.09	-0.10	-0.08	0.09	-0.07	-0.07	0.21	-.35†	.23	-.21	0.05	0.11	-0.06	-0.10									
17 R&D investment	4.25	2.70	0.04	.30**	-0.16	0.02	-0.15	-0.03	-0.13	.74***	0.24	-.53**	0.12	-0.20	-0.10	.32**	0.12								
18 Founding team size	2.28	1.42	0.00	0.15	-0.10	0.02	-0.05	0.15	-0.14	0.04	0.31	-0.17	0.26	-0.03	-0.16	.26*	0.10	-.28**	.247*						
19 Age	4.02	0.94	0.07	-0.14	-0.07	-0.02	0.12	0.08	0.03	-0.14	-0.24	0.23	-0.04	0.21	-0.19	-0.16	0.04	.32**	-.09	-.18†					
20 Education	2.42	0.64	.20†	.30**	-0.14	-0.07	-0.19	-.24*	-0.11	0.16	0.16	-0.14	0.20	0.18	0.01	.31**	0.06	-.19†	.24*	0.14	-0.18				
21 Startup experience dummy	0.52	0.50	-0.16	-.26*	0.00	0.14	0.05	0.18	-0.07	-0.08	0.29	-0.13	0.31	0.27	-0.05	-.20†	0.16	-0.09	-0.01	-0.01	0.15	-.28**			
22 Ownership	7.41	3.78	-0.10	-0.10	.28*	-0.15	0.11	-0.03	-0.30	-0.23	-0.01	.34†	-0.10	0.10	.25*	-.27*	-.42***	.28**	-.30**	-.56***	0.02	-.26*	0.01		
23 Participation in social activities	5.56	3.15	-0.13	0.01	0.15	-0.06	0.11	0.19	-0.19	0.22	0.01	0.08	-0.04	0.17	-0.19	-0.04	-0.12	-0.14	-0.19	0.19	-0.03	-0.06	0.03	-0.04	
24 Working experience	19.75	9.30	-0.08	-0.13	0.03	0.08	0.06	-0.15	-0.33	0.09	0.25	0.03	0.31	0.16	-0.13	-0.08	0.07	0.06	-0.10	-0.08	.50***	-0.10	0.17	0.05	-0.07

^a N=85. † $p < .1$ (two-tailed) * $p < .05$ (two-tailed) ** $p < .01$ (two-tailed) *** $p < .001$ (two-tailed)

Table 3: Effects of Gender on Social Ties at the Start-Up Stage ^a

Variable	Strong research ties		Weak research ties		Strong business ties		Weak business ties		Strong political ties		Weak political ties	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
(Constant)	-.206 (.219)	-.112 (.242)	-.047 (.146)	-.177 (.157)	.163 (.254)	.087 (.282)	.782** (.285)	.833* (.318)	.021 (.065)	.051 (.072)	.083 (.102)	.115 (.113)
Industry dummy	.084 (.058)	.066 (.062)	.075† (.039)	.101* (.040)	-.107 (.068)	-.092 (.072)	-.056 (.076)	-.066 (.081)	-.006 (.017)	-.012 (.018)	-.021 (.027)	-.015 (.029)
Firm size	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.001* (.000)	.001* (.000)	-.001† (.000)	-.001† (.000)	-5.855E-005 (.000)	-5.823E-005 (.000)	.000 (.000)	.000 (.000)
Firm history	7.582E-005 (.004)	.001 (.004)	-.002 (.003)	-.003 (.002)	.001 (.004)	.000 (.004)	.003 (.005)	.003 (.005)	-.002 (.001)	-.001 (.001)	-.002 (.002)	-.002 (.002)
R&D investment	-.006 (.009)	-.007 (.009)	-.008 (.006)	.009 (.006)	.004 (.011)	.004 (.011)	.002 (.012)	.001 (.012)	-.001 (.003)	-.001 (.003)	.001 (.004)	.001 (.004)
Founding team size	-.009 (.021)	-.009 (.021)	.005 (.014)	.004 (.013)	.030 (.024)	.030 (.024)	-.022 (.027)	-.022 (.027)	-.002 (.006)	-.002 (.006)	.006 (.010)	.006 (.010)
Age	.056† (.033)	.051 (.034)	-.008 (.022)	-.002 (.022)	-.043 (.038)	-.039 (.039)	-.026 (.043)	-.029 (.044)	.010 (.010)	.008 (.010)	.009 (.015)	.008 (.016)
Education	.060 (.048)	.067 (.049)	.013 (.032)	.004 (.031)	-.025 (.055)	-.031 (.056)	-.029 (.062)	-.025 (.064)	-.007 (.014)	-.005 (.014)	-.033 (.022)	-.031 (.023)
Startup experience dummy	.007 (.054)	.006 (.054)	.009 (.036)	.010 (.035)	-.085 (.062)	-.085 (.063)	-.001 (.070)	-.001 (.071)	.001 (.016)	.001 (.016)	.043† (.025)	.043† (.025)
Ownership	.002 (.009)	.002 (.009)	.011† (.006)	.010 (.006)	.023* (.011)	.023* (.011)	-.031* (.012)	-.030* (.012)	.001 (.003)	.001 (.003)	-.001 (.004)	.000 (.004)
Participation in social activities	-.005 (.007)	-.007 (.007)	.002 (.005)	.004 (.005)	.008 (.008)	.009 (.008)	-.004 (.009)	-.005 (.010)	.001 (.002)	.001 (.002)	.005 (.003)	.004 (.003)
Working experience	-.003 (.003)	-.003 (.003)	-.001 (.002)	.000 (.002)	.000 (.003)	.000 (.003)	.004 (.004)	.004 (.004)	-5.341E-005 (.001)	.000 (.001)	-.002 (.001)	-.002 (.001)
Gender												
R ²	.203	.217	.272	.328	.269	.275	.154	.156	.131	.148	.301	.308
Adjusted R ²	.016	.013	.102	.153	.097	.086	-.044	-.064	-.073	-.075	.138	.128
Change in R ²		.014		.056		.006		.003		.017		.007
F change		.836		3.835†		.403		.141		.930		.461

^a The table gives parameter estimates; the standard error (below each parameter estimate) is in parentheses. † $p < .1$ (two-tailed) * $p < .05$ (two-tailed) ** $p < .01$ (two-tailed)

Table 4: Effects of Gender on Social Ties at the Expansion Stage ^a

Variable	Strong research ties		Weak research ties		Strong business ties		Weak business ties		Strong political ties		Weak political ties	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
(Constant)	.653 (.666)	.439 (.844)	-1.24 (.157)	-1.11 (.202)	-.061 (.528)	-.819† (.379)	.079 (.994)	1.009 (1.077)	-.340 (.361)	-.793* (.320)	.714 (.681)	1.213 (.795)
Industry dummy	-.030 (.263)	.010 (.292)	-.077 (.062)	-.079 (.070)	.227 (.208)	.367* (.131)	-.111 (.392)	-.284 (.373)	.093 (.143)	.177 (.111)	.447 (.269)	.354 (.275)
Firm size	-.002 (.005)	-.001 (.006)	.000 (.001)	.000 (.001)	-.006 (.004)	-.004 (.003)	.006 (.008)	.003 (.008)	-.009* (.003)	-.007* (.002)	.000 (.005)	-.002 (.006)
Firm history	.012 (.025)	.010 (.027)	-.003 (.006)	-.002 (.006)	-.037† (.020)	-.044* (.012)	.015 (.037)	.022 (.034)	-.028† (.013)	-.031* (.010)	-.037 (.025)	-.033 (.025)
R&D investment	-.003 (.035)	-.001 (.039)	.066*** (.008)	.066*** (.009)	.013 (.028)	.030 (.017)	-.055 (.052)	-.075 (.049)	.008 (.019)	.018 (.015)	-.047 (.036)	-.058 (.036)
Founding team size	-.032 (.085)	-.038 (.095)	-.091** (.022)	-.091** (.024)	.135 (.068)	.114* (.043)	-.036 (.127)	-.010 (.121)	.109† (.046)	.096* (.036)	.068 (.087)	.081 (.089)
Age	.003 (.085)	.016 (.095)	.013 (.020)	.013 (.023)	.036 (.068)	.083 (.043)	.004 (.127)	-.054 (.121)	.084 (.046)	.112* (.036)	-.009 (.087)	-.040 (.089)
Education	.001 (.150)	-.009 (.160)	.019 (.035)	.020 (.038)	.177 (.119)	.140† (.072)	-.097 (.223)	-.051 (.205)	.235* (.081)	.213* (.061)	.052 (.153)	.077 (.151)
Startup experience dummy	.025 (.224)	.041 (.241)	-.009 (.033)	-.010 (.038)	-.221 (.178)	-.164 (.108)	.104 (.335)	.034 (.307)	-.221 (.122)	-.187† (.230)	-.057 (.230)	-.095 (.227)
Ownership	-.047 (.025)	-.042 (.029)	-.002 (.006)	-.002 (.007)	.034 (.020)	.050** (.013)	.016 (.038)	-.005 (.037)	.012 (.014)	.022† (.011)	.010 (.026)	-.001 (.027)
Participation in social activities	-.013 (.037)	-.013 (.039)	.018† (.009)	.018 (.009)	-.048 (.029)	-.046* (.017)	.038 (.055)	.036 (.050)	-.032 (.020)	-.031† (.015)	-.035 (.038)	-.037 (.037)
Working experience	-.009 (.007)	-.009 (.008)	.001 (.002)	.001 (.002)	.012† (.006)	.015** (.003)	-.001 (.011)	-.004 (.010)	.009* (.004)	.011* (.003)	.005 (.007)	-.003 (.007)
Gender	.100 (.215)	.100 (.215)	-.006 (.051)	-.006 (.051)	.353* (.096)	.353* (.096)	-.433 (.214)	-.433 (.214)	.211* (.081)	.211* (.081)	-.233 (.202)	-.233 (.202)
R ²	.585	.600	.938	.938	.709	.710	.405	.405	.797	.797	.498	.498
Adjusted R ²	-.066	-.201	.840	.814	.253	.253	-.531	-.531	.478	.478	-.291	-.291
Change in R ²	.014	.014	.000	.000	.201	.201	.175	.175	.107	.107	.091	.091
F change	.216	.216	.014	.014	13.433*	13.433*	2.496	2.496	6.717*	6.717*	1.322	1.322

^aThe table gives parameter estimates; the standard error (below each parameter estimate) is in parentheses. † $p < .1$ (two-tailed) * $p < .05$ (two-tailed) ** $p < .01$ (two-tailed) *** $p < .001$ (two-tailed)

RESULTS AND IMPLICATIONS

General least squares modeling was used to analyze the data, because the regressors are exogenous and there is no perfect multi-collinearity. The total number of respondents was 85 ($N = 85$). Table 2 presents the descriptive statistics and correlation matrix of all the variables. For example, if the Strong Research Ties variable at the startup stage has a mean of 0.08, the average percentage of the entrepreneur's strong social ties to universities and research institutes in the total number of his or her social ties is 8% ($SD = 0.15$). A Weak Research Ties variable at the startup stage with a mean of 0.09 indicates that the average percentage of the entrepreneur's weak social ties to universities and research institutes in the total number of his or her social ties is 9% ($SD = 0.14$).

The models in Table 3 indicate a marginally significant positive relationship between gender and weak research ties. The results of this regression analysis gave weak support to Hypothesis 1. The models in Table 4 indicate a significant positive relationship between gender and strong business ties and a significant positive relationship between gender and strong political ties. Thus Hypotheses 2a and 2b are strongly supported.

DISCUSSION

This study found gender differences in terms of founders' utilization of social relations to expand businesses and profiled female entrepreneurs' social networking strategies in business expansion. The female entrepreneurs in this study established weak research ties at the startup stage and strong business and political ties at the expansion stage. The research findings contribute to knowledge of female entrepreneurs and their business development.

Female entrepreneurs appeared to be sophisticated and effective in building social networks, spending time and effort developing their social relationships at different stages of venture development. At the start-up stage, women tended to build ties with researchers in developing new products. As the firm matured, women owners developed business and political ties to gain more benefits. Female entrepreneurs' superior ability to develop and manage diverse networks is their strategic asset in exploring business opportunities, dealing with threats and accessing key resources. Female entrepreneurs network for venture growth, particularly in the later stages of business development. We therefore recommend that female entrepreneurs be encouraged to actively network to establish and develop various social relationships as a means of accessing crucial resources for business creation and expansion.

For managerial practice, female entrepreneurs should proactively build strong business and political ties at the expansion stage to grow their businesses. Their social ties are critical for SMEs to optimize internal knowledge capabilities and access external knowledge sources. The research findings help define the conditions to unlock the full potential of female entrepreneurs. Women face various barriers to fulfilling their ambition, such as lack of access to informal networks where they can make important connections. This study tells us that women need to shift networking behaviors to successfully create and develop new ventures.

Despite the contributions of this research, several limitations and unanswered questions remain, providing important directions for future research. First, because the respondent is the sole data source for both independent and dependent variables, common method variance (Avolio, Yammarino and Bass, 1991; Podsakoff and Organ, 1986) could introduce spurious correlation between the variables. Future research could address this issue by using multiple data sources. Second, the survey response rate is 6%, despite adherence to many established survey design and implementation recommendations aimed at producing higher response rates. However, no evidence of non-response bias was found in the results of the Mann-Whitney test. Because low response rates are common in survey research of entrepreneurs, future research could use other methods, such as interviews, to increase the response rate. Third, the data in this article were collected from multiple industries; therefore, further research could focus on a single industry or a set of related industries. Scholars might undertake further research to investigate the specific strategies female entrepreneurs adopt to enhance the quality of their social networks.

CONCLUSION

This research examined gender differences in SME founders' social network development. It was found that female entrepreneurs establish weak research ties at the start-up stage and strong business and political ties at the expansion stage. The findings contribute to knowledge of female entrepreneurs and their business development. Female entrepreneurs react against social barriers by actively networking in male-dominated business environments at both the business start-up and expansion stages. Women's superior ability to develop and manage diverse networks is their strategic asset in exploring business opportunities, dealing with threats and accessing key resources. They should be encouraged to network actively so as to establish and develop various social relationships to access crucial resources for business creation and expansion. This better understanding of gender differences in the SME founder's social network development will help support female entrepreneurs and women-owned enterprises.

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