

Shukla, Manasi; Guelich, Ulrike; Bechina Arntzen, Aurilla Aurelie

## Article

# An empirical investigation of gender impact on technological innovativeness among Thai entrepreneurs via GEM database

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## **An Empirical Investigation of Gender Impact on Technological Innovativeness Among Thai Entrepreneurs via GEM Database**

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**Abstract:** Recent studies have shown that innovation could play an important role in fostering new business models by defining new or improved services, products or processes. In addition, more and more women are playing an important role in the country's development by starting new businesses. However, lack of competitiveness has led to a number of failures. Therefore, innovation could provide the backbone for a sustainable and competitive economy. Understanding the link between innovation and its role in enhancing entrepreneurship capabilities needs to be further investigated from a gender perspective. In Asia, specifically Thailand shows a notable high rate of women entrepreneurship in various entrepreneurial phases. Utilizing the 2012 GEM (*Global Entrepreneurship Monitor*) Thailand database, this paper seeks to empirically investigate the impact of gender on innovativeness in Thai entrepreneurs. This paper categorizes entrepreneurs into three groups based on their business progress: those who intend to start a business within three years, young businesses owners and established entrepreneurs. The results interestingly indicate a lack of gender difference in innovativeness for those in new business while some gender impact was present in innovativeness for those who are in the extreme case like either intending to start a business or established businesses. In addition to innovativeness, technology was also found to be a key factor for entrepreneurs. Interestingly, the results differ distinctly between female and male established entrepreneurs in the medium / high technology sector significantly. In the low technology both male and female have significant and similar aptitude for using new technology. But, in higher technology the innovativeness was embraced more by male than female participants. Specifically, men have more propensity to be innovative in uses of new technology while women have some interest in new technology innovation in personal realms compared to organizational realm! Therefore we observe that entrepreneurs seeking opportunities tend to organize knowledge and information in

their field of endeavor in varied forms. The significance of this study is in thus confirming that gender differences are found in innovativeness exhibited by either intending or fully established Thai entrepreneurs. While no gender difference was found in those entrepreneurs that are in the process of establishing their business for around three and half years. Furthermore, it is observed that young female business owners are consistently found to be more innovative except for in cases of high technology innovations!

**Key Words:** Established entrepreneurs, Gender, Global Entrepreneurship Monitor (GEM), Innovativeness, Technology, Thailand

## 1. Introduction

An innovator is a person with a high degree of will-power and motivation who is also endowed with an ability to act as an entrepreneur. The main reason for innovation to be used as an indicator of growth in empirical research is its accountability and measurement. Researchers use either input measure like R&D expenditure (Mansfield, 1972) or innovation outcomes like patents (Griliches, 1998).

### Entrepreneurship and Gender:

In almost all countries men are found to be more entrepreneurial than women, but more women than men are nowadays found to pursue entrepreneurial businesses due to necessity, lack of employment or income options more in low income countries. Also, noted is that women tended to take a more conservative approach to start new businesses in the sense that they require less start-up capital, use existing technology, and pursue existing markets (Minniti & Nardone, 2007). Women are finding an evolution in this pattern due to globalization, tolerances with new technology and global businesses and cultural unification (Newburry et al, 2008).

### *Gender Differences in Innovation in Entrepreneurship*

Gender is the difference in biology, psychology, behavior and experience set attached to being a male or female. Gender diversity may bring to an organization multiple skills, knowledge, perspectives, and backgrounds. The combination of different knowledge and skills (e.g. mathematics and interpersonal skills) leads to higher levels of creativity and innovation (Ali, Kulik, & Metz, 2011). There are no gender-related differences in venture innovation / risk situations and strategies for new and established enterprises, with innovation being defined as creating a new, unique, and different product or service. (Sonfield et al, 2001).

Despite Thailand's high rate of female entrepreneurs and established business owners compared to other countries, entrepreneurs seem to approach the market with non-innovative products that are already known to the customers. Kelley et al. (2013) suggest that growth rates and strong market demands in Developing Asia lead to the acceptance of less innovative products with less competitive differentiation.

### *Women and National Development*

There is increasing recognition about the competitiveness of a country that relies heavily on active involvement of women in education, business, politics and Research & Development. The growth and participation of women in the labor market has been welcomed as a key resource to the economy. However, the gender stereotypical beliefs and practices are problematic and deeply ingrained in socio-cultural context of a nation. (Shukla & Arntzen, 2013).

Gender difference in leadership in management has been of interest to researchers in psychology, management, and sociology. Moran states arguments in favor of women asserting their unique position in business and management (Moran, 1992). A study by McKinsey & Company highlights how fewer women are taking part in company decision making processes and business and entrepreneurship. (Mc Kinsey and Company, 2008).

## **2. Entrepreneurship**

There is no consistent definition of entrepreneurship. Some argue that “the term ‘entrepreneur’ is used as a generic for any individual who starts-up, runs and maybe grows a new business venture” (Taylor & Walley, 2004). Others define an entrepreneur as someone who emphasizes factors such as growth and innovation, and who turn innovation, financial and business efforts into economic goods and services (Yu & Si, 2012). One main source of measuring entrepreneurial activities in a global context is the Global Entrepreneurship Monitor (GEM) consortium; their definition is used in this paper. Entrepreneurship according to GEM is defined as “any attempt at new business or new venture creation, such as self-employment, a new business organization, or the expansion of an existing business, by an individual, a team of individuals, or an established business” (Bosma et al, 2012).

### **2.1. Entrepreneurship and Innovation**

There is general agreement that entrepreneurship and innovation are closely linked and positively related (Miller & Friesen, 1982) and that the process of innovation is likely to be one factor for firm performance and for the drive of economic growth (Yu & Si, 2012). Wong et al suggest to regard firm formation and technological innovation as separate economic growth determinants with only a small number of businesses being involved in true technological innovation (Wong et al, 2005). Koellinger (2008) in his empirical study on reasons for entrepreneurial innovativeness suggests that both innovative and imitative entrepreneurship forms co-exist in economies and that entrepreneurial innovativeness is highly influenced also by individual factors like self-confidence or education. In venture creation entrepreneurs can be distinguished as “innovators” and “reproducers” (Aldrich & Kenworthy, 1999). Innovator entrepreneurs enter the market with significantly different routines and competencies than reproducer entrepreneurs who add little or no new innovative knowledge to existing markets. Thai entrepreneurs in general pursue this “me too”- approach in their entrepreneurial activities, copying from existing businesses rather than exploring alternatives. To pursue innovation, they need to overcome the obstacle to challenge and even to ignore existing dominant cultural routines (Aldrich & Kenworthy, 1999). Another reason for their limited interest in innovation and new technologies is the lack of financial resources for innovation and the size of their mostly small-scale enterprises (Sapprasert et al, 2012).

Nochian and Schott constructed an organizational innovation confidence index in entrepreneurship from the same three questions used by Levie combined with a measurement for innovation by two questions: Do customers consider the product or service new and unfamiliar, and: are the technologies or procedures required for the product or service new? Their findings show that organizational confidence in innovation had a significant impact on the entrepreneur's innovativeness. Entrepreneurs with the ability to see and promote new products, services, technologies and in addition acknowledges their positive effect on the business will in turn act more innovatively (Nochian & Schott, 2012).

## **2.2. Entrepreneurship, Technology and Innovation:**

Each year, Ernst & Young presents its U.S. Entrepreneurs and they found that all entrepreneurs embrace innovation. Innovation results from attempting different things and often accepting failure as just another outcome of acceptance of change and emergence of new ideas. Successful entrepreneurs try to find new methods and technologies for doing tried and tested ways! Since, twenty one percent of last year's finalists were in the technology sector, which implies innovation is happening exclusively in technology firms.

## **3. Three groups of Entrepreneurs**

The entrepreneurial cycle is a process which distinguishes the phases from a business idea to an established business, often defined as four phases from conception over gestation, infancy to adolescence (Aldrich & Martinez, 2001; Reynolds, 1994). GEM identifies entrepreneurs as potential entrepreneurs, intending to start a new business within the next three years and mainly led by their beliefs and attitudes; nascent (starting up and operating them for less than 3 months) and young business owners (more than 3 and less than 42 months); and established entrepreneurs, operating their businesses for more than 42 months (Xavier et al, 2013). Challenges and requirements for the business owners vary during these phases and are influenced by a variety of factors, innovativeness being one of them. This paper refers to the three phases as they are summed up by GEM from entrepreneurial intentions (phase 1) to TEA - either nascent or young (phase 2), or as established business (phase 3).

The three phases-approach to firm development is useful to frame the different stages a firm passes through, since each entrepreneurial phase represents a specific strategic context in which the entrepreneur operates. We choose this approach because the different phases can help to highlight different characters of entrepreneurial innovativeness that might benefit the female or male entrepreneur and his/her business in its specific development stage.

In Thailand, potential entrepreneurs intending to start their businesses within the next three years, have an average age of 36.7, with little difference between female (36.5) and male (36.9) future entrepreneurs. Educational background for future male entrepreneurs is either a bachelor (31.2%) or a high school degree (20.6%), whereas women mostly have a bachelor degree (34.4%) or elementary school education of year 1 - 6 (18.3%).

## **4. Literature Review**

Entrepreneurs adjust to the changes and opportunities in the environment with the assistance of their optimism and risk behavior. Literature review indicates that established entrepreneurs have the goal of a significant venture growth (Ooghe & De Prijcker, 2008). Established entrepreneurs create new jobs, create opportunities for social mobility, foster flexibility and contribute to competition whereas new businesses have more risk rather than established business (Liao et al, 2009). Recently started high growth businesses in comparison to established businesses are more vulnerable and have greater survival concerns. Due to their size and human resources strength, recently started high growth businesses lack strategic managers. Such businesses carry a plethora of roles for their owners (Jennings & Beaver, 1997). Lack of entrepreneurial qualification or gender factors are at times causes of entrepreneurial failure (Tushabomwe-Kazooba, 2006). In entrepreneurial initiatives, there exists higher education norm that causes the entrepreneurial initiative's high performance (Bates, 2005). Prior experience in entrepreneurship has also been related to business success in general (Bosma et al, 2004; Gimeno et al, 1997; Madsen et al, 2003). Therefore it is hypothesized that:

*H1: The growing business entrepreneurs will differ from established businesses in general.*

In contrast to reproducer entrepreneurs, who add little or no knowledge to existing markets, products and processes, innovator entrepreneurs pursue innovation by challenging and often by ignoring existing dominant cultural routines (Aldrich & Kenworthy, 1999). One reason why reproducer entrepreneurs show limited interest in innovation are financial constraints for innovation and the size of their small-scale enterprises (Sapprasert et al., 2012). We use Levie's approach who defined innovation confidence as "the degree to which individuals are willing to engage with and perceive benefit from new products or services, or products or services that embody new technology." (Levie, 2008, p.4).

Also, as discussed earlier, prior experience in entrepreneurship is also related with a business' success (Bosma et al, 2004; Gimeno et al, 1997; Madsen et al, 2003). Despite Thailand's high rate of female entrepreneurs and established business owners compared to other countries, entrepreneurs seem to approach the market with non-innovative products, which are already known to the customers. Kelley et al. (2013) suggest that growth rates and strong market demands in Developing Asia lead to the acceptance of less innovative products with less competitive differentiation. Therefore we try to explore whether the innovativeness (Levie, 2008) is any different between established entrepreneurs and growing entrepreneurs in Thailand, given that we have access to GEM 2012 country database (Global Entrepreneurship Monitor, 2012). Thus we hypothesize:

*H2: The growing business entrepreneurs will differ from established businesses in innovativeness.*

There is increasing recognition about the competitiveness of a country that relies heavily on active involvement of women in education, business, politics and Research & Development. The growth and participation of women in labor market has been welcomed as a key resource to the economy. Despite all this, the gender stereotypical beliefs and practices are problematic and deeply ingrained in socio-cultural context of a nation. (Shukla & Arntzen, 2013). Gender difference in leadership in management has been of interest to researchers in psychology,

management, and sociology. Moran states arguments in favor of women asserting their unique position in business and management (Moran, 1992). A study by McKinsey & Company highlights that fewer women are taking part in company decision making processes and business and entrepreneurship (Mc Kinsey and Company, 2008). Gender differences in entrepreneurship are well documented in previous research (Kelley et al, 2013; Popescu, 2012). Female entrepreneurial participation varies across the countries of GEM. Total early-stage entrepreneurial activity (TEA, composed of nascent and new entrepreneurs) for men and for women differ less in innovation-driven economies while female TEA rates are relatively higher in efficiency-driven economies.

Thailand as an efficiency-driven economy is notable for the high and equitable share of female to male TEA. Nonetheless, female entrepreneurship as compared to that of male in general is limited in most countries, and gender disparity is prevalent due to many different factors (Sappasert et al., 2012). The GEM global report 2012 found that a higher female to male ratio in entrepreneurship is prevalent only in five out of 69 economies: in Asia in Thailand, in Latin America in Ecuador and Panama, and in Sub-Sahara in Ghana and Nigeria. 2012, a total of 48.6% of the Thai population was engaged in entrepreneurial activities, either as nascent or new business owners (TEA), or as established entrepreneurs, ranking first in Asia (Xavier et al., 2013). TEA accounted for 18.9% (21% female / 17% male), and 29.7% were established business owners (15.6% female / 14.1% male), in every business phase more women than men. In contrast to these self-employment rates of women, Thailand is a country with medium overall gender equality. Thailand has a GII (gender inequality index) value of 0.36, ranking it 66 out of 148 countries in the 2012 index; only 15.7 % of parliamentary seats are held by women; only 29 % of adult women have reached secondary or higher level of education compared to 35.6 % of their male counterparts, and female participation in the labor market is 63.8 % versus 80 % for men (UNDP, 2011). Therefore we try to explore whether the gender is any different for established entrepreneurs and growing entrepreneurs in Thailand, given that we have access to GEM 2012 country database (Global Entrepreneurship Monitor, 2012). Thus we hypothesize:

*H3: The growing business entrepreneurs will differ from established businesses across gender.*

Based on this discussion, we combine the above three hypotheses to lead to our main hypothesis below:

*H4: The innovativeness of growing business entrepreneurs will differ from that of established businesses across male and female in Thailand*

### **Entrepreneurship and Technology:**

In addition to innovativeness, technology was also found to be a key factor for entrepreneurs. Entrepreneurs seeking opportunities tend to organize knowledge and information in their field of endeavor. They need to be aware of changes in the environment needed to spot opportunities. Governments help in providing a munificent economic environment. Also in the present century, organizations need to continually identify new opportunities so as to survive (McGrath et al, 1996; Shane & Venkataraman, 2000). Baron (2004) states that opportunities concern ideas that are new, feasible, marketable, legal, and profitable. This includes new technology ideas



(Venkataraman & Sarasvathy, 2001). Cohen and Levinthal (1990) illustrates how the dynamic capability of absorptive capacity (Companys & McMullen, 2007), based on R&D knowledge is applied to find new technological opportunities. Baron (2006) stated that entrepreneurs use cognitive frameworks to enable connections between changes in technology, demographics, markets, government regulations et al. factors. According to this cognitive framework, the mind creates patterns and schematics utilizing the connection of prior knowledge (Hastie & Kumar, 1979; Mitchell et al., 2007), education, training (Vesper, 1990) and experiences and skills (Shepherd & DeTienne, 2001). These frameworks serve to perceive the new market trends. Thereby these suggest ideas for new technology products or services enabling novel entrepreneurial opportunities (Aldrich & Martinez, 2001). The trends in the market, economic environment and technology have been considered an important source of opportunity (Lindsay & Craig, 2002; McMullen et al, 1990; Schumpeter, 1934). Stevenson and Gumpert (1985) postulate four such trends that influence the opportunity recognition: technology, consumer economics, social values and governmental regulations, while Vesper (1990) suggested demographics. Hence, this research supports that growing industry, increased demand of new technology and products, increases opportunity recognition (Zahra, 1991).

From a gendered point of view, technology is often associated with masculinity, because the key actors in technology are more often men than women. Founding a tech startup is generally associated to be a male domain (Nelson & Levesque, 2007; Roan & Whitehouse, 2007). Faulkner's findings emphasize that "technology is an important element in the gender identities of men who work and play with technologies" (Faulkner, 2001, p.90). Dautzenberg's study on high-tech manufacturing and technology-based service firms in Germany clearly reveals a gender gap in technology-based industries with fewer women than men operating in the technology sector (Dautzenberg, 2012).

Hence, we hypothesize:

*H5: The innovativeness of entrepreneurs will differ for technology-orientation across gender.*

## **5. Research Methodology**

We use GEM database for this study. Data were collected by the GEM Thailand team between May and July 2012 in Thailand in connection with the GEM 2012 Global Study on Entrepreneurship with a sample size of 3,000 persons of the adult population in Thailand (age 18 – 64). The Thai data source stems from the individual level data of the GEM Thailand research and can further be distinguished into entrepreneurs versus non-entrepreneurs, as well as different entrepreneurial phases in which the entrepreneurs are currently operating. GEM data uses standard research instruments to provide reliable data on entrepreneurship, both on a macro and on a micro level. Experts provide insights into entrepreneurial framework conditions, namely: finance, government policies and government programs, education and training, R&D transfer, commercial and physical infrastructure, internal market openness and cultural and social norms. On a micro-level attitudes of the Thai population as of the Thai entrepreneurs, consisting of individual self-perceptions and societal impressions, are gathered, as are entrepreneurial activities. Since Thailand represents the country in GEM with the highest participation of women

in entrepreneurial activities, gender, particularly female attitudes and activities in Thailand, might provide important insights in the macro and the micro level of entrepreneurship.

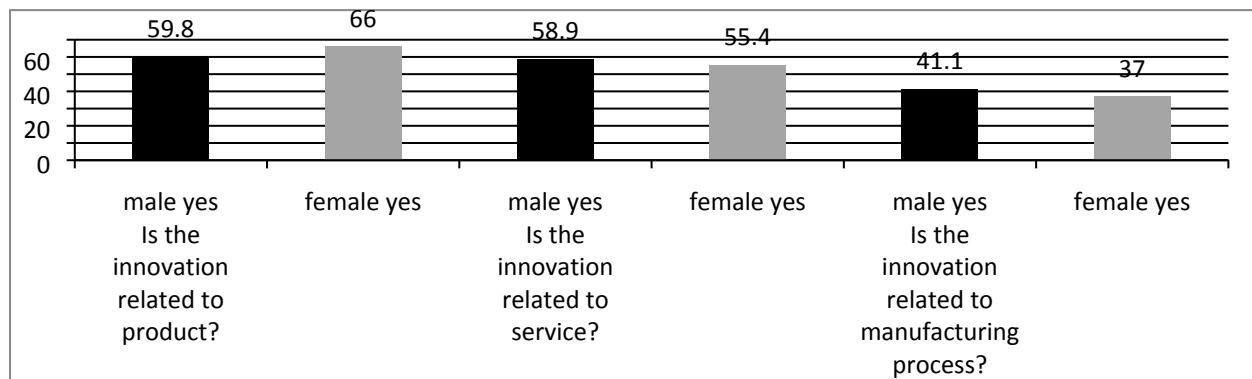
*GEM database used for this study has been kindly provided by BUSEM, Bangkok University resources for further research and interpretation.*

This paper categorizes entrepreneurs into three groups based on their business progress: those who intend to start a business and especially the young businesses start-ups and established entrepreneurs.

We use Levie's approach who defined innovation confidence as "the degree to which individuals are willing to engage with and perceive benefit from new products or services, or products or services that embody new technology." (Levie, 2008, p.4). Compared to non-entrepreneurs, higher innovation confidence is generally found in entrepreneurs - both in startups and in young or established businesses. More traditional societies -like in Thailand- seem to welcome new products and services more than rather rational societies. Levie's (2008) measures for innovation are composed of three survey items: (1) willingness to buy new products or services; (2) willingness to try new products and services that involve new technology; and (3) beliefs about how/whether innovations will improve their lives. The innovativeness of entrepreneurs was thus measured using the above scale and T-tests were carried out to test the differences in gender related innovativeness in the entrepreneurs' responses

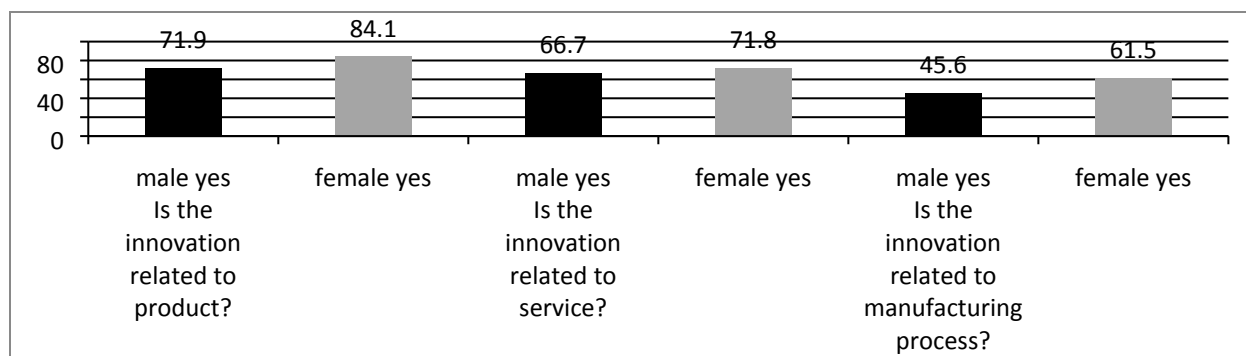
## 6. Results

The data was collected randomly from three categories of entrepreneurs. The responses obtained were from those who intend to start a business within three years (male=303, female=364), young businesses owners (male=208, female=254) and established entrepreneurs (male=562, female=665). The bar graph representation of responses for three entrepreneurship categories is depicted below in Figure 1-3. It is observed that women are consistently more innovative as new entrepreneurs who have young businesses (3.5 years maximum).

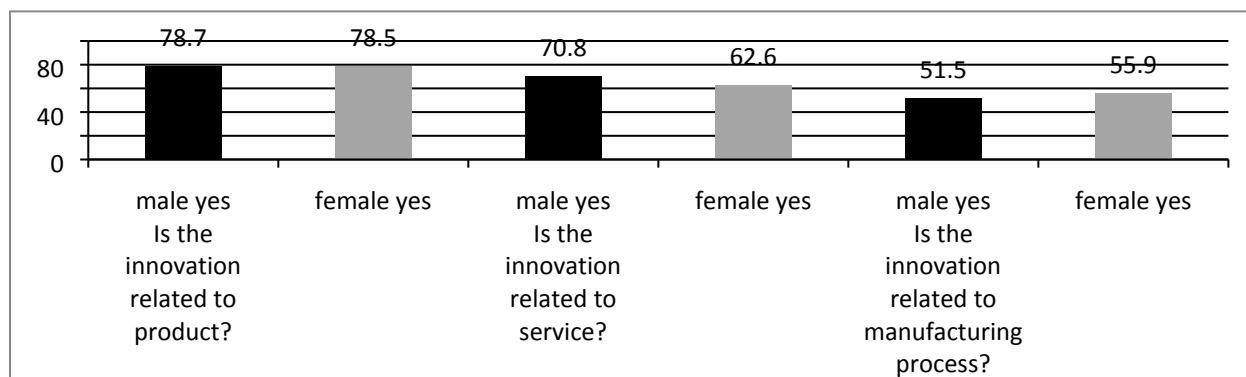


**Figure 1:** Those who intend to start a business within the next 3 years





**Figure 2:** Young business owners (max 3.5 years in business)



**Figure 3:** Established business owners (more than 3.5 years in business)

Thereafter T-tests were carried out to test the differences in gender innovativeness in the entrepreneurs' responses (Table 1). The results interestingly indicate a lack of gender difference in innovativeness for new business owners while some gender impact was present in innovativeness for those who are in the extremity involved in entrepreneurship, either intending to start a business or running established businesses. Our hypotheses H1: The growing business entrepreneurs will differ from established businesses in general and H2: The growing business entrepreneurs will differ from established businesses in innovativeness are thus confirmed. Hypothesis H3: The growing business entrepreneurs will differ from established businesses across gender is confirmed. Therefore hypothesis 4 is confirmed.

**Table 1:** T Test for measuring gender differences (m/f) in innovativeness in three stages of entrepreneurship

Questions	Gender	Intending to start a business	New businesses	Established Businesses
In the next 6 months you are likely to buy products or services that are new to the market.	Male	.055	.186	.117
	Female	.054	.186	.116

In the next 6 months you are likely to try products or services that use new technologies for the first time.	Male	.040	.136	.017
	Female	.039	.134	.016
In the next 6 months, new products and services will improve your life.	Male	.044	.279	.931
	Female	.044	.279	.930
In the next 6 months the organization that you work in is likely to buy products or services that are new to the organization.	Male	.067	.428	.032
	Female	.068	.427	.031
In the next 6 months you are likely to try products or services that use new technologies in your daily work for the first time.	Male	.009	.095	.007
	Female	.010	.094	.007
In the next 6 months, new products and services will improve your working life.	Male	.777	.098	.830
	Female	.777	.099	.830

Thereafter further T-tests were carried out to test the differences in gender innovativeness in the responses of young and of established business owners, who categorize their businesses either as being in the no or low technology or in the medium or high technology sector (Table 2). Interestingly, the results differ distinctly between female and male established entrepreneurs in the medium / high technology sector significantly. In the low technology both male and female have significant and similar aptitude for using new technology. But, in higher technology the innovativeness was embraced more by male than female participants. Specifically, men have more propensity to be innovative in uses of new technology while women have some interest in new technology innovation in personal realms compared to organizational realm! Therefore hypothesis 5 is confirmed.

**Table 2:** T Test for measuring gender differences (m/f) in innovativeness for businesses in no/low technology and in medium/high technology sectors

Questions	Gender	All Businesses	
		no / low technology sector	medium / high technology sector
In the next 6 months you are likely to buy products or services that are new to the	Male	.000	.003

market.	Female	.000	.205
In the next 6 months you are likely to try products or services that use new technologies for the first time.	Male	.000	.020
	Female	.000	---
In the next 6 months, new products and services will improve your life.	Male	.000	.012
	Female	.000	.205
In the next 6 months the organization that you work in is likely to buy products or services that are new to the organization.	Male	.000	.003
	Female	.000	---
In the next 6 months you are likely to try products or services that use new technologies in your daily work for the first time.	Male	.000	.003
	Female	.000	---
In the next 6 months, new products and services will improve your working life.	Male	.000	.011
	Female	.000	---

## Conclusion

As female entrepreneurships and business ownerships continue to develop, researchers will be forced to take the gender differences across a wide array of variables into account. With similarity in educational levels of the new generation of entrepreneurs, it is no longer correct to suggest that the management skills of the female lag behind those of her male counterpart. Special training programs are needed to assess both genders' special needs. With more women leaving the corporate sector to pursue entrepreneurship this phenomenon deserves a closer look.

The significance of this study is in thus confirming that gender differences are found in innovativeness exhibited by either intending or fully established Thai entrepreneurs. While no gender difference was found in those entrepreneurs that are in the process of establishing their business for around three and half years. Furthermore, it is observed that young female business owners are consistently found to be more innovative except for in cases of high technology innovations!

Regarding the findings of Nochian and Schott (2012) that entrepreneurs who have the ability to see and promote new products, services, technologies and in addition acknowledge their positive effect on the business will in turn act more innovatively, we might conclude that –since female entrepreneurs are more positive about innovative products than their male counterparts- Thai women entrepreneurs will in consequence act more innovatively in their enterprises.

Our preliminary findings are useful for future research both in innovation- as in gender-related entrepreneurship research. These results could be used to evaluate further how gender-related

innovativeness might evolve differently in countries with a high female participation in entrepreneurship..

## References

- Aldrich, H. E., & Kenworthy, A. (1999). The accidental entrepreneur: Campbellian antinomies and organizational foundings. *Variations in organization science: In honor of Donald T. Campbell*, 19-33.
- Aldrich, H. E., & Martinez, M. A. (2001). Many are called, but few are chosen: An evolutionary perspective for the study of entrepreneurship. *Entrepreneurship Theory and Practice*, 25(4), 41-56.
- Ali, M., Kulik, C. T., & Metz, I. (2011). The gender diversity–performance relationship in services and manufacturing organizations. *The International Journal of Human Resource Management*, 22(07), 1464-1485.
- Baron, R. (2004). *Opportunity recognition: Insights from a cognitive perspective* (Vol. 4). Greenwich, CT: : Information Age Publishing.
- Baron, R. A. (2006). Opportunity recognition as pattern recognition: How entrepreneurs “connect the dots” to identify new business opportunities. *The Academy of Management Perspectives*, 20(1), 104-119.
- Bates, T. (2005). Analysis of young, small firms that have closed: delineating successful from unsuccessful closures. *Journal of Business Venturing*, 20(3), 343-358.
- Bosma, N., Van Praag, M., Thurik, R., & De Wit, G. (2004). The value of human and social capital investments for the business performance of startups. *Small Business Economics*, 23(3), 227-236.
- Bosma, N., Wennekers, S., & Amorós, J. E. (2012). 2011 Extended Report: Entrepreneuris and Entrepreneurial Employees Across the Globe. (*GERA / GEM*).
- Cohen, W. M., & Levinthal, D. A. (1990). Absorptive capacity: a new perspective on learning and innovation. *Administrative science quarterly*, 128-152.
- Companys, Y. E., & McMullen, J. S. (2007). Strategic entrepreneurs at work: the nature, discovery, and exploitation of entrepreneurial opportunities. *Small Business Economics*, 28(4), 301-322.
- Dautzenberg, K. (2012). Gender differences of business owners in technology-based firms. *International Journal of Gender and Entrepreneurship*, 4(1), 79-98.

- Faulkner, W. (2001). *The technology question in feminism: A view from feminist technology studies*. Paper presented at the Women's studies international forum.
- Gimeno, J., Folta, T. B., Cooper, A. C., & Woo, C. Y. (1997). Survival of the fittest? Entrepreneurial human capital and the persistence of underperforming firms. *Administrative science quarterly*, 750-783.
- Griliches, Z. (1998). Patent statistics as economic indicators: a survey *R&D and productivity: the econometric evidence* (pp. 287-343): University of Chicago Press.
- Hastie, R., & Kumar, P. A. (1979). Person memory: Personality traits as organizing principles in memory for behaviors. *Journal of Personality and Social Psychology*, 37(1), 25.
- Kelley, D., Brush, C., Greene, P., & Litovsky, Y. (2013). GEM 2012 Women's Report: (GERA / GEM).
- Koellinger, P. (2008). Why are some entrepreneurs more innovative than others? *Small Business Economics*, 31(1), 21-37.
- Levie, J. (2008). The IIP Innovation Confidence Index 2007 Report. *Hunter Centre for Entrepreneurship University of Strathclyde, Glasgow, United Kingdom*, 29.
- Liao, J., Welsch, H., & Moutray, C. (2008). Start-Up Resources and Entrepreneurial Discontinuance: The Case of Nascent Entrepreneurs<sup>1</sup>. *Journal of Small Business Strategy*, 19(2), 1.
- Lindsay, N. J., & Craig, J. B. (2002). A framework for understanding opportunity recognition: Entrepreneurs versus private equity financiers. *The Journal of Private Equity*, 6(1), 13-24.
- Madsen, H., Neergaard, H., & Ulhøi, J. P. (2003). Knowledge-intensive entrepreneurship and human capital. *Journal of Small Business and Enterprise Development*, 10(4), 426-434.
- Mansfield, E. (1972). *Contribution of Research and Development to Economic Growth of the United States*. Paper presented at the Colloquim on Research and Development and Economic Growth Productivity, National Science Foundation, Washington, DC.
- Mc Kinsey and Company. (2008). Women matter 2: female leadership, a competitive edge for the future. In M. K. Company (Ed.).
- McGrath, R. G., Tsai, M.-H., Venkataraman, S., & MacMillan, I. C. (1996). Innovation, competitive advantage and rent: a model and test. *Management Science*, 42(3), 389-403.
- McMullan, W. E., Long, W. A., & Jovanovich, H. B. (1990). *Developing new ventures: The entrepreneurial option*: Harcourt Brace Jovanovich.

- Miller, D., & Friesen, P. H. (1982). Innovation in conservative and entrepreneurial firms: two models of strategic momentum. *Strategic management journal*, 3(1), 1-25.
- Minniti, M., & Nardone, C. (2007). Being in someone else's shoes: the role of gender in nascent entrepreneurship. *Small Business Economics*, 28(2-3), 223-238.
- Mitchell, R. K., Busenitz, L. W., Bird, B., Marie Gaglio, C., McMullen, J. S., Morse, E. A., & Smith, J. B. (2007). The central question in entrepreneurial cognition research 2007. *Entrepreneurship Theory and Practice*, 31(1), 1-27.
- Moran, B. B. (1992). Gender differences in leadership. *Library Trends*, 40(3), 475-491.
- Nelson, T., & Levesque, L. L. (2007). The Status of Women in Corporate Governance in High-Growth, High-Potential Firms. *Entrepreneurship Theory and Practice*, 31(2), 209-232.
- Newburry, W., Belkin, L. Y., & Ansari, P. (2008). Perceived career opportunities from globalization: globalization capabilities and attitudes towards women in Iran and the US. *Journal of International Business Studies*, 39(5), 814-832.
- Nochian, N., & Schott, T. (2012). Entrepreneurs' Confidence in Innovation and Their Innovativeness. *Economic Review - Journal of Economics and Business*, X(1).
- Ooghe, H., & De Prijcker, S. (2008). Failure processes and causes of company bankruptcy: a typology. *Management Decision*, 46(2), 223-242.
- Popescu, S. (2012). Women And Men In Entrepreneurship. *Journal of Knowledge Management, Economics and Information Technology*, 2(4).
- Reynolds, P. (1994). Reducing barriers to understanding new firm gestation: prevalence and success of nascent entrepreneurs. *Academy of Management, Dallas, TX*.
- Roan, A., & Whitehouse, G. (2007). Women, information technology and 'waves of optimism': Australian evidence on 'mixed-skill' jobs. *New Technology, Work and Employment*, 22(1), 21-33.
- Sapprasert, K., Aksaranugraha, S., Sakhornrad, P., & Guelich, U. (2012). GEM Thailand - 2011 National Report: (*GEM Thailand, Bangkok University*).
- Schumpeter, J. A. (1934). *The theory of economic development: An inquiry into profits, capital, credit, interest, and the business cycle* (Vol. 55): Transaction publishers.
- Shane, S., & Venkataraman, S. (2000). The promise of entrepreneurship as a field of research. *Academy of management review*, 25(1), 217-226.
- Shepherd, D. A., & DeTienne, D. R. (2001). Discovery of opportunities: Anomalies, accumulation and alertness. *Frontiers of Entrepreneurship Research*, 138-148.

- Shukla, M., & Arntzen, A. B. (2013). *Gender diversity in management and leadership: a new competitive advantage?* Paper presented at the ICMLG, Bangkok, Thailand.
- Sonfield, M., Lussier, R., Corman, J., & McKinney, M. (2001). Gender Comparisons in Strategic Decision-Making: An Empirical Analysis of the Entrepreneurial Strategy Matrix. *Journal of Small Business Management*, 39(2), 165-173.
- Stevenson, H. H., & Gumpert, D. E. (1985). The heart of entrepreneurship. *Harvard Business*, 184.
- Taylor, D. W., & Walley, E. E. (2004). The green entrepreneur: opportunist, maverick or visionary? *International Journal of Entrepreneurship and Small Business*, 1(1), 56-69.
- Tushabomwe-Kazooba, C. (2006). Causes of small business failure in Uganda: a case study from Bushenyi and Mbarara Towns. *African Studies Quarterly*, 8(4), 1-13.
- UNDP. (2011). United Nations Human Development Report 2011 - GII Gender Inequality Index Retrieved 11.03.2013, from <http://hdrstats.undp.org/en/countries/profiles/THA.html>
- Venkataraman, S., & Sarasvathy, S. D. (2001). Strategy and entrepreneurship: Outlines of an untold story.
- Vesper, K. H. (1990). New venture strategies. *University of Illinois at Urbana-Champaign's Academy for Entrepreneurial Leadership Historical Research Reference in Entrepreneurship*.
- Wong, P. K., Ho, Y. P., & Autio, E. (2005). Entrepreneurship, innovation and economic growth: Evidence from GEM data. *Small Business Economics*, 24(3), 335-350.
- Xavier, S., Kelley, D., Kew, J., Herrington, M., & Vorderwülbecke, A. (2013). Global Entrepreneurship Monitor (GEM) 2012 Global Report: (GERA / GEM).
- Yu, X., & Si, S. (2012). Innovation, internationalization and entrepreneurship: A new venture research perspective. *Innovation: Management, policy & practice*, 14(4), 524-539.
- Zahra, S. A. (1991). Predictors and financial outcomes of corporate entrepreneurship: An exploratory study. *Journal of business venturing*, 6(4), 259-285.