

Research Article

Sustainable Growth of Women Owned Technoprises in Malaysia

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Abstract: This study is generated in pursuit of emerging global need to optimize economic growth through women technopreneurship development. The direct effect of psychological capital and indirect effect through innovative capability was envisaged for assessment of sustainable growth of women-owned technoprises in Malaysia. For survey, convenience sampling technique was employed to collect data from 150 women owned technoprises (SMEs) in Johor Bahru. Findings from hierarchical multiple regression analysis showed positive and significant relationship of risk propensity and internal locus of control with innovation capability and sustainable growth. However, paradoxical results regarding women entrepreneurs' need for achievement and self-efficacy were established. Nevertheless, no mediating role of innovative capability was found. Policy implications and future research recommendations are also discussed.

Keywords: Innovative capability, psychological capital, SMEs, sustainable growth, women-owned technoprises

INTRODUCTION

Fostering the triple helix of women entrepreneurship-SMEs-technology entrepreneurship development for optimizing the national economic growth is among most up and coming strategic imperatives for most of the developed and transitional economies of the world (Padnos, 2010; Tambunan, 2011; Alam *et al.*, 2011). Nevertheless, where contemporary entrepreneurship literature argues upon the importance of women owned businesses for economic purposes (Lawton, 2010; Matilde *et al.*, 2012) need for firms with more sustainable growth arises vividly (Hart, 2003). For sustainable growth among small firms, essential role of entrepreneur's personal motivation for growth (Berry and Taggart, 1998) and firm's innovation capability has been documented (Lee and Hsieh, 2010).

Although some explicatory studies have been carried out to tap the issues of firm's growth (Brush *et al.*, 2006; Lee, 2009) and innovative capability (Matilde *et al.*, 2012) of women owned businesses in the developed countries, however, studies regarding these most current entrepreneurial issues are lacking in the developing countries (Trivedi *et al.*, 2009; Tambunan, 2011) and transitional economies of the world, like Malaysia (Mat and Razak, 2011; Alam, 2011). Hence the objective of this study explanatory study is to first of all study the direct relationship of

women technopreneurs psychological capital with their firms' innovative capability and sustainable growth, respectively. Secondly, the direct relationship of innovative capability and firms' sustainable growth is ensued to be evaluated and finally, the mediating role of firms' innovative capability will be assessed for the relationship of women technopreneurs' psychological capital and their firms' sustainable growth (Fig. 1).

Sustainable Growth (SG): A company is known to have sustainable growth when it is capable of maintaining its growth without facing any financial, structural or strategic setbacks (Danchev, 2006). This growth challenge grows more vigorous in more tumultuous, fast changing and competitive technology based markets and is impossible to accrue unless special attention is given to two most important dimensions of building up growth strategy and growth capability, simultaneously and interactively (Timothy, 1997). Sustainable growth depends on a more long-term growth orientation of the entrepreneurs (Jonash, 2005). Technopreneurship is related to technology as the key element of all entrepreneurial activities, which are driven mainly by the entrepreneur himself (Prelazzi, 2009). Berry and Taggart (1998), in their studies on importance of combining technology and corporate strategy for competitive advantage in small hi-tech firms, elaborated that growth in effect of the

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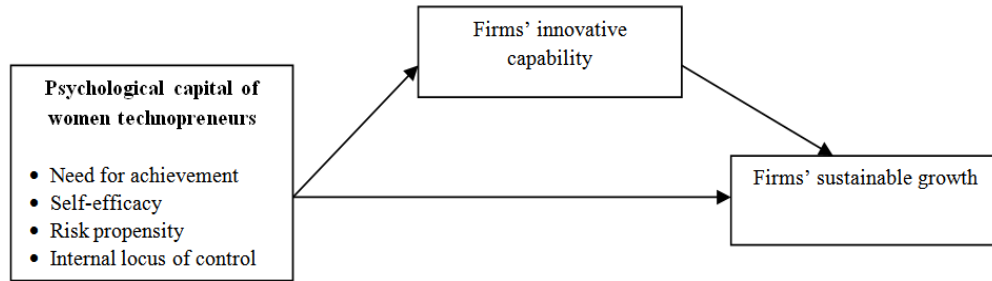


Fig. 1: Theoretical framework

‘technology-business strategy fit’ in these SMEs is primarily based on the attributes and strategic orientation of the firm’s most ‘active element’... the entrepreneur.

Women entrepreneurs and firms’ sustainable growth: Comparative research on the growth of the hi-tech companies led by men and women shows that companies run by men are more growth oriented and result producing, whereof those led by women are mostly prone to failure in their developmental stages (Brush, 1992). The precedence for making decisions regarding growth among women entrepreneurs is a due to both external factors like government, society, business sector, macro-economic, culture on one hand and internal factors like personal motivations, knowledge and skills and social networking (Linkages) and strategy orientation, on the other (Morris *et al.*, 2006; Nasser *et al.*, 2009; Tambunan, 2009, 2011). According to Davidsson (1991), among the factors of ability, need and opportunity to grow the most influential and persistent factor for actual growth in firms has been entrepreneurs’ need to grow. Growth in women owned firms is greatly influenced by their endogenous factors (Arasti *et al.*, 2012) and better growth results may be achieved, if they change their ‘preferences’ regarding firm growth (Du Reitz and Henrekson, 2000).

In discussing emergence of ‘technopreneurial matriarchy’, Foo *et al.* (2006) insisted upon investigation of female entrepreneurs’ intrinsic psychosomatic processes and the changes required towards their successful technopreneurship development.

Women technopreneurship development in Malaysia: Identifying the importance of hi-tech and technology based ventures for technological and economic thrust of the national portfolio, Government of Malaysia has been trying hard to foster entry and survival of the ‘fair sex’ in the ‘tech world’ through investments in entrepreneurial education, training and financial assistance by different government agencies (Ariff and Abu Bakar, 2003). Establishment of Ministry of Entrepreneur and Cooperative Development

(MECD), Ministry of women, Family and Community Development (MFECD) and Small and Medium Industries Development Corporation (SMIDEC) has promoted women entrepreneurship in the region (Teoh and Chong, 2008). Although, Malaysian women are more educated and well aware of the entrepreneurial opportunities due to unbridling efforts of Malaysian government for enhancing their contribution in the economic growth (Ndubisi and Kahraman, 2006) and entering in the working class of the nation more than ever before (Ariff and Abubakar, 2003; Teoh and Chong, 2008), however, their practical involvement in technopreneurship development is quite low (Ndubisi, 2005; Brush *et al.*, 2009). Nevertheless, these women entrepreneurs do not consider growth of their firms as ‘worth pursuing’ (Idris, 2009) due to their psychological motives behind their venture start-up (Morris *et al.*, 2006; Tambunan, 2009).

Psychological Capital (PC): Psychological capital refers to individual’s psychosomatic characteristics regarding knowledge of having and exploiting personal capabilities for better performance (Hisrich, 1990). In entrepreneurial research, the most important and widely documented characteristics related to individuals’ psychological being include self-efficacy (Kundu and Rani, 2007), risk propensity (Brindley, 2005; Ndubisi, 2007), internal locus of control (Kundu and Rani, 2007; Othman and Ishak, 2009) and need for achievement (McClelland, 1961; Kundu and Rani, 2007). Self-efficacy is illustrated as one of the most influential individual characteristics in envisioning and accomplishing personal and organizational goals (Bandura, 1997; Stajkovic and Luthans, 1998). The literature related to entrepreneurs’ personal characteristics and their firm’s performance noticeably explains the enlightened role of entrepreneurs’ self-efficacy in bringing out positive performance outcomes in shape of high levels of growth regarding employment (Baum *et al.*, 2001), revenue (Baum and Locke, 2004) and work satisfaction (Bradley and Roberts, 2004). Risk propensity is defined as the tendency of an individual to accept or reject risk and is considered to be the most differentiating attribute of an entrepreneur from a manager (Brockhaus, 1980) and is one of the most appropriate measures for entrepreneurs’ risk

behavior (Brindley, 2005). Risk taking propensity is strongly rooted in personality however its intensity may fluctuate in different domains (Nicholson *et al.*, 2005). Need for Achievement is related to one's eagerness to accomplish the set personal goals in a more competitive, efficient and effective way in relation to one's competitors or one's earlier achievements (McClelland, 1961). Internal locus of control is the entrepreneurial attribute of perceiving the outcomes of all entrepreneurial activities carried out and decisions made by the entrepreneur as self-controlled rather than environmental dependent is known as the (Rotter, 1966). Brockhaus and Horowitz (1986) demonstrated that entrepreneurs with strong internal locus of control are the most liable ones for new venture start-ups, high in their self-perception of risk and related outcomes.

Psychological capital of women entrepreneurs and firms' sustainable growth: Where research on firms' growth in transitional economies has focused on factors related to human and social factors of growth (Hashi and Krasniqi, 2011), the psychological factors have been found to have even more pronounced effects especially among women entrepreneurs (Brush *et al.*, 2006), who need to break their 'stereotype mindsets' regarding growth (Masood, 2011). In depth study of literature shows that the most widely studied entrepreneurs' personal traits in having instrumental effect on their entrepreneurial attitude, behavior and growth orientation are self-efficacy (Kundu and Rani 2007; Alam, 2011), need for achievement (McClelland, 1961; Kundu and Rani, 2007; Alam, 2011), risk propensity (Brindley, 2005; Ndubisi, 2007; Alam, 2011) and internal locus of control (Kundu and Rani 2007; Othman and Ishak, 2009).

Entrepreneurial self-efficacy has been found to be related to firms' strategic decision making (Forbes, 2005) which leads the firm towards high levels of growth anticipation and struggle to realize the expected goals. Gender based studies related to effects of self-efficacy on growth aspirations revealed women entrepreneurs having low self-efficacy which overshadows their desire for growth (Kirkwood, 2009).

Male and female entrepreneurs differ in their risk attitude, propensity and factors affecting them (Killgore *et al.*, 2010; Salleh and Ibrahim, 2011). Women entrepreneurs tend to be noticeably different in risk taking (Sexton and Bowmann-Upton, 1990) and pay exclusive attention to all risk indications thus being more risk averse in nature (Chung, 1998). Cliff (1998) argued that their 'desire for growth' may be the same but they are more concerned for the risk associated with the 'pace' of growth. Women with high growth propensity view their businesses differently, perceive lesser conflicts regarding their household and business responsibilities and are comparatively less risk averse (Morris *et al.*, 2006) and are proficient in technology adoption (Ndubisi, 2007).

Need for Achievement has been documented as the most inadequate psychological attribute found in the women of developing countries which is restraining the women of the developing region to show their enthusiasm for entrepreneurial development (D'Cruz, 2003; Tambunan, 2009). Seet *et al.* (2008) although did not find any significant difference among the male and female entrepreneurs in their motivational factors for entrepreneurial intentions, still the most important and highly rated motivational factor for entrepreneurial development was the need for achievement.

Regarding female entrepreneurs and their internality of behavioral control studies from showed that female entrepreneurs tend to be different from the general population, secretaries and managers in comparison to their higher levels of internal locus of control depicting their analogy with their male counterparts (Waddel, 1983). Bowen and Hisrich (1986) revealed that although most of the literature supports the incidence of greater internal locus of control among the women entrepreneurs, still more scrutiny is required regarding this attribute ability to crack the barrier on their way to enter male ensconced high skilled and high technology sectors.

H-1: Psychological capital of women technopreneurs in Malaysia is related to their firms' sustainable growth such that higher their self-efficacy, need for achievement, risk propensity and internal locus of control, greater will be their firms' sustainable growth.

Innovative Capability (IC): Innovation is a prime source of bringing in novelty, competitive edge and growth in a technology business (Jeffery and Rana, 2008). Innovative capability is a 'complex concept' (Terziovski, 2009) of firm's capacity to pursue innovative activity by developing new products, envisioning market needs and trends and updating product/process development with the best technological processes to satisfy future needs (Adler and Shenbar, 1990). Guan and Ma (2003) explained the two main dimensions of innovation capabilities as core capabilities (R&D, Manufacturing and Marketing) and supplementary capabilities (learning, Organization, resource allocation and strategies). The marketing dimension of innovative capability is related to sales growth and product competitiveness, strategic and learning capabilities help in innovation performance, resource allocation capability in product excellence and the capabilities of R&D, manufacturing and organization help in maintaining overall competitiveness (Karagouni and Papadopoulos, 2007). Weerawardena (2003) explained the importance of developing both technological (product, process) and non-technological (management and marketing) innovative capabilities.

Firm's innovative capability and psychological capital: SMEs are innovation personified due to their structural flexibility (Tie-Jun and Jin, 2006; Laforet, 2008; Liang *et al.*, 2010), however role of entrepreneur's personal orientation and approach to leverage firms' resources for continuous innovation capability is inevitable (Tie-Jun and Jin, 2006; Yu and Yanfei, 2009; Dakhli and Clercq, 2004). Process of innovation, from invention to exploitation, is intimately related to the constellation of personality traits which distinguish the 'innovators' from 'adapters' (Kirton, 1989). Hence, the behavior of the actors involved and the psychological point of view regarding innovation needs to be identified (Cropley and Cropley, 2009). Innovation in women owned firms are perceived to be comparatively low due to the gender differentiation (Roomi and Parrot, 2008; Tambunan, 2009) and for their 'invisibility' in technology based businesses (Nyberg, 2009). Few recent studies in this regard have found influential role of women entrepreneurs' psychological traits on innovativeness (Babalola, 2010; Alam *et al.*, 2011) though more scrutiny is required to understand this relationship especially when it comes to more dynamic industries (Idris, 2008). The attributes of self-efficacy and internal locus of control are significantly related to higher levels of innovative activities (Kumar and Uz Kurt, 2010) among women entrepreneurs (Babalola, 2009). Recent studies from developing countries showed that confidence, achievement need, risk taking and innovativeness greatly influenced the firm's innovative capability (Alam, 2011) and women specifically need to develop these attributes in order to reap benefits of innovativeness and entrepreneurialism (Guler and Tinar, 2009).

H-2: Psychological capital of women technopreneurs in Malaysia is related to their firms' innovative capability such that higher their self-efficacy, need for achievement, risk propensity and internal locus of control, greater will be their firms' innovative capability.

Innovative capability and sustainable growth: If growth is the essence of entrepreneurship (Sexton, 1997) and entrepreneurship is all about bringing in new activity, then innovation is indispensable to guide its path to growth (Jonash, 2005) especially regarding technology entrepreneurship development (Burgelman *et al.*, 2004). Hence, the future of the small enterprises do not only exists in 'getting better' but 'being different' all at the same time (Hamel and Prahalad, 1994). Fostering organizational innovation greatly affects their powerfulness of competition particularly amidst burgeoning technological and globalization rush (Übuis *et al.*, 2013). Firms' Innovative capability has engendering capacity for systematic innovations for

firm's overall performance (Lawson and Samson, 2001; Uz Kurt *et al.*, 2013), economic progress (Tiexeria and Fortuna, 2003) and growth outcomes (Tie-Jun and Jin, 2006; Subrahmanya *et al.*, 2010). In order to maintain the sustainability and innovation capability of their firms, entrepreneurs must plan for successful innovative activities (Karagouni and Papadopoulos, 2007). Women being less inclined to the innovativeness decree the lower growth performance of their firms (Bruderl and Preisendorfer, 2000). This 'female-male innovation gap' resulting from their 'occupational sex segregation' and gender differences for 'choosing fields of study' has been found to greatly affect their firm growth motives (Strohmeyer and Tonoyan, 2008).

H-3: Innovative capability of women owned technoprisers is positively related to their firms' sustainable growth.

Mediating role of innovative capability: In some studies in addition to its direct effect on business performance, innovative capability has been found to intercede and strengthen the relationship of entrepreneurs' human and social capital with business performance also (Tiexeria and Fortuna, 2003; Yokakul *et al.*, 2011). Lee and Hsieh (2010) in their attempt to find out direct and indirect effects of innovative capability on sustained competitive advantage found innovative capability had a direct effect on sustainable competitive advantage whereas marketing capability had and indirect one through innovative capability. In the same vein, success in innovation has been found to mediate the relationship of market orientation and success in market operating in more turbulent technological industries (Bodlaj *et al.*, 2012) (Fig. 1).

H-4: Innovative capability of women owned technoprisers positively mediates the relationship between psychological capital of women technopreneurs and their firms' sustainable growth.

MATERIALS AND METHODS

Questionnaire: The questionnaire was developed by exhaustive study of the literature related to the constructs of the study. It was made up of two sections where section A is designed to get demographic profile of the women owned Entrepreneurs and their technoprisers (SMEs) and section B included total 43 question items against all variables.

Likert's 5-item scale ranging from 1 = Strongly Disagree to 5 = Strongly Agree was used against each Item. The capacity of the questionnaire regarding understanding, coherence, reliability and validity was checked and improved by getting responses from the respondents of pilot study as well as experts in this field.

Table 1: Results for reliability analysis

Scale reliability	
Cronbach's alpha	No. of items
0.828	43

Table 2: Results for demographic analysis

Variables	Frequency	(%)
Age		
Below 30	48	60.0
31-40	28	35.0
Above 50	4	5.0
Marital status		
Single	64	80
Married	16	20
Education		
Secondary	24	30.0
Diploma	48	60.0
Masters	8	10.0
Firm's size (No. of workers)		
1-15	64	80.0
16-45	8	10.0
46-100	8	10.0
Ethnic group		
Malay	48	60.0
Chinese	32	40.0

Table 3: Correlation matrix

	SE	NA	RP	ILC	IC
SE	1	0.650**	0.309**	0.462**	0.129
NA	0.650**	1	0.497**	0.291**	-0.103
RP	0.309**	0.497**	1	0.511**	0.395**
ILC	0.462**	0.291**	0.511**	1	0.474**
IC	0.129	-0.103	0.395**	0.474**	1

** : Significant correlation at the 0.01 level (1-tailed); N = 80

Sampling: According to the definition of SMEs by NSDC (2005), the target population of the present study comprised of all women-owned technology based SMEs operating in Manufacturing, Agriculture and Service sectors of Malaysia with number of employees not more than 150 and annual sales turn over with a maximum of RM 25 million. To select the sample from this target population, non-probabilistic approach of convenience sampling was used. Data was collected by using mail survey method. The addresses of the sample women owned technoprises were taken from the Official Business directory of SMI Association, 2011. By using convenience sampling scheme, 150 women owned technoprises (SMEs) were selected from Johor Bahru. Follow-ups by e-mail and personal visits were also made to ensure a good response rate. Out of 150 distributed questionnaires, 115 were received. Only 80 were found useable as 35 were discarded for not completely filled, making the response rate of 53.3%.

RESULTS

Reliability: The analysis of overall scale reliability and item-analysis was carried out during pilot study by computing Cronbach's alpha. Results for the Cronbach's alpha of the questionnaire was 0.828 showing high internal consistency between all items in the scale hence making it highly reliable (Table 1).

Demographics: Results of demographic profile of women technopreneurs showed that analysis showed that most of the Malay women entrepreneurs are involved in technology businesses making up to 60% of the total women technopreneurs. These women technopreneurs are mostly single (80%), young (80%) ranging in age from less than 30 up to 40 and with graduate/bachelors (60%) qualification. Profile of SMEs owned by women technopreneurs illustrated that most of them are micro enterprises (80%) with employees not more than 15 (Table 2).

Correlation analysis: The correlation analysis was carried out in order to check the strength of relationships among different variables under study as well as existence of multicollinearity. All independent variables under study showed Pearson's coefficient less than 0.8 and VIF values less than 10 cancelled out prevalence of multicollinearity and susceptible distortion in the regression results due to it (Table 3).

Hierarchical multiple regression analysis: Three separate regression models were evaluated in which first of all linear regression analysis was applied to check the direct relationship of PC indicators with SG. (Table 4). In first step, all the psychological capital indicators of need for achievement, self-efficacy, risk propensity and internal locus of control were entered to the regression model. In contrary to our proposition for H-1, results showed significant results only for risk propensity ($\beta = 0.498$, p -value = 0.000*) and internal locus of control ($\beta = 0.292$, p -value = 0.007*), hence, H-1 was not fully supported. Furthermore, the insignificant relationship of need for achievement ($\beta = -0.035$, p -value = 0.774) and self-efficacy ($\beta = 0.056$, p -value = 0.642) with SG also showed that high levels of self-efficacy and achievement need, which are probably required more for venture start-up are not considered as important attributes and for the long term growth of their firms. In second step, direct relationship of PC indicators with IC was assessed. It was found that as proposed, risk propensity ($\beta = 0.445$, p -value = 0.000*) and internal locus of control ($\beta = 0.312$, p -value = 0.008*) had significant positive relationship with IC, however, need for achievement ($\beta = -0.547$, p -value = 0.000*) was significantly but negatively related to innovative capability. Nevertheless, self-efficacy ($\beta = 0.203$, p -value = 0.122) did not show any significant relationship with IC. Hence, H-2 was partially supported (Table 4).

Finally, hierarchical multiple regression was run to test the direct relationship of IC with SG in step-1 and then relationship of PC indicators with SG via IC. Results revealed significant and positive relationship of IC ($\beta = 0.423$, p -value = 0.000*) where the variance in SG due to IC was recorded as almost 18% ($R^2 = 0.179$). This supported our H-3 and showed that women owned firms need to develop strong innovative capabilities in

Table 4: Results for overall regression analysis

	Model-1	Model-2	Model-3	Model-4
Dependent variable →	SG	IC	SG	SG
Predictors ↓				
SE	0.056 (0.642)	0.203 (0.122)	-	0.030 (0.807)
NA	-0.035 (0.774)	-0.547 (0.000)*	-	0.035 (0.793)
RP	0.498 (0.000)*	0.445 (0.000)*	-	0.441 (0.000)*
ILC	0.292 (0.007)*	0.312 (0.008)*	-	0.252 (0.026)*
Mediator				
IC			0.423 (0.000)*	0.129 (0.228)
R ²	0.494	0.406	0.179	0.503
ΔR ²	-	-	-	0.325*
ΔF	18.275*	12.814*	16.996*	12.094*
p-value	0.000*	0.000*	0.000*	0.000*

*: Coefficients significant at p<0.005; n = 80

order to sustain their growth in the technology world. On second step, the mediation of IC in relationship between PC indicators and SG was checked. Results showed that the mediation was insignificant ($\beta = 0.129$, p-value = 0.228). However, it was found that β coefficients of all independent variables decreased and remained significant for RP (p-value = 0.000*) and ILC (p-value = 0.026*). This shows direct effects of risk propensity and internal locus of control of women technopreneurs on their firm's sustainable growth is stronger than indirect effect through innovative capability and there might be some other mediating variables not included in the model are responsible for the variance in mediating model.

DISCUSSION

The demographic details of profile of women technopreneurs from are in strong corroboration to earlier studies on women entrepreneurship in Malaysia (Alam *et al.*, 2011; Idris, 2011; Fuad *et al.*, 2011). However, in contrary to earlier studies (Fuad *et al.*, 2011) most of the female technopreneurs were unmarried (80%). This disparity could be due to their business in technology industry that demands more time, effort and skills which married women are not susceptible to espouse for their household duties (Ndubisi and Kahraman, 2006; Brush *et al.*, 2009; Idris, 2011). Results for demographic profile of women technopreneurs also illustrated that effort of Malaysian government in facilitating women with education, trainings and finance has helped them and especially Malay women entrepreneurs to crack the barrier to enter in a more male dominating tech-world (Ariff and Abu Bakar, 2003; Teoh and Chong, 2008). SME profile of women owned technoprises also confirmed the findings of Malaysian SMEs Census (2011) denoting that out of total women owned SMEs in Malaysia 88% are micro enterprises.

Sustainable growth of women owned technoprises depends only on the risk taking propensity and internal locus of control of women technopreneurs while need for achievement and self-efficacy have insignificant relationship. This is in contrary to previous studies (Fuad and Bohari, 2011; Alam *et al.*, 2011), albeit,

corroborate the arguments that role of entrepreneurs' need for achievement in small firms' start-up and survival is not without problems and require special scrutiny (Davidsson, 1989). Achievement need entails more intrinsic perspective of success and performance than extrinsic returns (McClelland, 1961) and is more often found to exert influence on process of success rather than its performance (Entrialgo *et al.*, 2000). Women being less instrumental than men, rely more on intrinsic motivational needs (need for achievement, self-fulfillment, effectiveness) (Dzisi, 2008) that alone are not capable of determining firms' growth (Manolova *et al.*, 2012) and may have negative effect on it as well.

Moreover, the relationship of psychological traits like need for achievement with entrepreneurial activities like growth is contingent to strong action oriented moderators to show stronger effects (Rauch and Frese, 2000). The result for women entrepreneurs' self-efficacy is in accordance with the previous research on contingency of its insignificant and sometimes negative effects on firm performance especially in dynamic industries (Hmieleski and Baron, 2008). Moreover, success and growth of women owned businesses is strongly influenced by their relational and social (strong ties) concerns (Alam *et al.*, 2011; Manolova *et al.*, 2012). Such additional factors can possibly surrogate the effect of technopreneurs achievement need and efficacy to grow their businesses especially in collectivist societies (Tajeddini and Mueller, 2009). However, considering network support can play vital role in the relationship between their entrepreneurial self-efficacy and firms' growth (Bratkovic *et al.*, 2012). It is, hence suggested that their desire (need for achievement) and aptitude (self-efficacy) may not be sufficient to attain success through growth performance especially in technology business where along with personal skills, attitude to tackle growth obstacles (risk propensity) (Arasti *et al.*, 2012) and 'plug holes quickly' in times of uncertainties and adversities (internal locus of control) (Rose *et al.*, 2006) is more essential for long-term survivability.

To develop firms' innovative capability, it is found that women technopreneurs' risk taking propensity and

internal locus of control is highly required. This finding is in line with former studies that to bring in innovation, entrepreneurs need to be responsible for their own actions by calculating and take moderate risks (Guler and Tinar, 2009; Alam, 2011). Self-efficacy of women technopreneurs did not show any influence on their firms' innovation capability, which provides further insights into the environment (industry) specific role (Hmieleski and Baron, 2008). It is attributed, in this regard, to need to identify role of a more recent dimension of creative/innovation self-efficacy in addition to general entrepreneurial self-efficacy (Tierney and Farmer, 2002). Self-efficacy is developmental yet domain specific (Bandura, 1997) and entrepreneurs who feel themselves to perform business activities effectively in one domain (general self-efficacy) may not find it easy to do it in a different and creative way (creative self-efficacy) and conducive to innovative endeavors (Tierney and Farmer, 2002).

Negative relationship of need for achievement was found which is contrasting to previous studies on effects this psychological trait on innovativeness of women entrepreneurs (Dzisi, 2008; Alam, 2011). In contrast to many developed countries where innovation is consistently encouraged, the typology of women entrepreneurs in Malaysia do not consider it vital and worth pursuing at all times due to being more obsessed with influencing strong ties, less expressive in creating and managing innovation and lacking transformational attributes of innovativeness that effects their overall firms' innovative performance (Idris, 2009). Moreover, a closer scrutiny on effects of distinct dimensions of innovativeness (gender differentiation and ego differentiation) among women entrepreneurs shows that women portraying high levels of innovativeness are generally found low in their ego differentiation indicators like achievement need and this peculiarity is more pronounced in distinct and competitive industries (Idris, 2011).

Women are also required to foster their firms' innovative capabilities regarding product, services and processes in order to not only sustain but grow their businesses in the more male-dominating and competitive technology industry. However, the incongruity with earlier studies regarding the insignificant mediation of innovative capability can be explained in terms of the contingency analyses regarding nature and context of the industry and the relative strategic behavior (Entrialgo *et al.*, 2000). This also shed light on the need to not only develop but manage the innovative capabilities of the firm in a strategic way in order to achieve sustainable growth (Francis and Bessant, 2005; Rush *et al.*, 2007). Malaysian women technopreneurs need to understand that technopreneurs are not merely responsible for 'bringing in' innovations by technology strategy but 'bringing out' them by establishing and market relationships (Ng *et al.*, 2012) and strategy for ultimate

benefit of the firm and community (Abdullah and Ahcene, 2011).

POLICY AND FUTURE RESEARCH RECOMMENDATIONS AND LIMITATIONS

Through this study, some important policy recommendations are generated in order to improve sustainable growth among women owned technopris in Malaysia. In light of our results we suggest that the policy makers for small and medium enterprises in Malaysia should not only consider fixing the financial barriers of women owned businesses but should also establish programs to hone their psychological dexterity through industry linkage to get maximum innovation and growth output. This can be achieved by holding motivational seminars and designing training workshops specifically to apprehend the skills, attributes and knowledge required in technology industry. Another way is to acquaint them with significance of innovation development and management for firms' growth by implementing consistent and harmonized policies in technology sector for learning, adopting and operationalizing the innovation process.

In addition to our strength of tapping the most unexploited issue of innovative capability and sustainable growth among women owned businesses and specifically small firms in technology industry, this study hold some limitations too. First of all, the results of the study are not generalizable to all women owned technology based firms across Malaysia as the sample was taken from Johor Bahru only. Secondly, the sample was chosen by convenience sampling scheme which also minimizes generalizability of the findings. Finally, no demarcation was made between purely women-owned firms or firms owned by women entrepreneurs as only representative of the family business (owned actually by father/husband) as well as between necessity women entrepreneurs and opportunity entrepreneurs. This may hold some viable differences in the effects of psychological traits especially need for achievement and self-efficacy on firms innovative capability and sustainable growth due to effects of strong social ties on such businesses.

Future research on sample including women owned technology based firms from other parts of Malaysia can add significant and more reliable insinuation to the literature. Moreover, data collected through more reliable sampling schemes (random sampling) can provide accurate picture of the demographics of women technopreneurs in Malaysia and more reliable results can be achieved regarding the evaluation of their firms' growth. The inconsistency of results especially regarding effects of need for achievement and self-efficacy entails the reassessment of their effect on firms' innovative capability and sustainable growth. It is envisaged to incorporate more action oriented

moderators (strategic approach, market orientation) and potential mediators (optimism, networking, innovative capability management) to these relationships.

CONCLUSION

Growth in women owned technoprises of Malaysia depends on the innovative capability of their firms that can be achieved by nurturing their psychological capacities; however they may also need other managerial and strategic skills to reap fruitful benefits in this regard.

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