Key influences on innovativeness of women entrepreneurs in Tunisia: the mediating role of entrepreneurial self-efficacy

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Abstract: This paper investigates the determinant factors of the innovativeness of women entrepreneurs. Following a quantitative approach, the study applies the structural equation modelling (SEM) technique to explore direct and indirect relationships among different constructs and to test the developed hypothesis. To run the analysis, we use 276 responses collected from Tunisian women entrepreneurs accompanied by business incubators. The determinants of innovativeness are essentially cognitive and psychological traits. Emotional intelligence, internal locus of control, entrepreneurial alertness and entrepreneurial self-efficacy are found to be positively and significantly associated with innovativeness. Only business networks indirectly reinforce innovativeness through entrepreneurial self-efficacy. However, there is no significant relationship between entrepreneurial training and innovativeness.

Keywords: innovativeness; female entrepreneurship; women entrepreneurs; psychological traits; entrepreneurial traits; Tunisia.

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1 Introduction

Entrepreneurship research during the last decades provoked a notable interest in studying the phenomenon of women entrepreneurship (Küçükatan, 2021; Ingalagi et al., 2021; Fuentes-Fuentes et al., 2017; Aaltio and Wang, 2016) as it promotes economic growth, the emergence of a feminist culture and the maintenance of gender equality (Ince-Yenilmez, 2021). However, entrepreneurial activity could be a hard challenge for women in Middle Eastern and North African (MENA) countries with limited resources and weak access to the labour market (Bastian et al., 2018). This research field is still immature in MENA region and far from being sufficiently explored with regard to the existing literature (Bastian et al., 2018; Drine and Grach, 2012). Ghiat (2020) argued that there is a need to carry out more extensive studies focus on women entrepreneurship in MENA countries. In addition, topics of innovation and innovativeness among women entrepreneurs are less dealt in the literatures on gender (Fuentes-Fuentes et al., 2017; Marlow and McAdam, 2012).

Our current study aims to identify determinants of innovativeness as a focal point of entrepreneurship through an integrated model. The structural model that we propose presents an original contribution to the field of female entrepreneurship. It integrates both direct and indirect effects between a set of cognitive, psychological and human capital factors and innovativeness. Then, we will test the model on sample of Tunisian women entrepreneurs who are in the creation stage of the entrepreneurial process. The choice of the Tunisian context is motivated by many reasons. First, Tunisia is one of the developing countries that have a growing number of women entrepreneurs (Hassine, 2016). Apart from socio-economic and socio-cultural factors, entrepreneurial support organisations are determinants of female entrepreneurship in Tunisia with an average of 17.10% (ILO, 2016). The choice of our research field is oriented towards these structures of support and assistance to business start-ups because it is the conducive environment to the promotion of entrepreneurs. In the Tunisian context, these devices constitute a catalyst for economic growth through job and business creation. Incubators and business centres do not share the same objectives but they both intervene throughout the entrepreneurial process especially at the pre-creation stage (including feasibility study, business plan, patenting, etc.), the creation stage (starting business, accompaniment, mentorship) and post-creation stage (accompaniment, growth).

This study aims to identify determinants of innovativeness among a sample of 276 Tunisian women entrepreneurs. The structural model that we propose presents an original contribution to the field of female entrepreneurship. It integrates both direct and indirect effects between a set of cognitive, psychological and human capital factors and innovativeness.

2 Theoretical framework and hypotheses

Innovativeness does not mean innovation and it encompasses multiple facets (Spieth et al., 2021). Both terms are complementary yet distinct (Czop and Leszczynska, 2011). Innovation is action, while innovativeness reflects the tendency to be innovative and unique in its way of doing things, it is the behaviour, attitude and will of a person or a company to follow the novelty.

Table 1 shows some relevant definitions of the concept of firm innovativeness in an entrepreneurial context.

Table 1 Relevant definitions of innovativeness in an entrepreneurial context

Authors	*Definitions*
Gözükara and Çolakoğlu (2016, p.35)	Innovativeness in turn, is the ability to do something in a creative and improved way. In the entrepreneurial context, innovativeness means the ability to exploit business opportunities.
Celik (2013, p.57)	Innovativeness can be a generic term for risk-taking, openness to experiences, creativity and leading opinion.
Ruiz-Arroyo et al. (2012, p.321)	Key capacity in the entrepreneurial process.
Kunz et al. (2011)	Firm capability to introduce value-added products or services for existing consumers and access new markets through willingness to change and adapt to consumer needs or preferences.
Ettlie et al. (1984)	Company innovativeness is the tendency of a company to innovate or develop new products.
Hurley and Hult (1998, p.44)	Innovativeness is the notion of openness to new ideas as an aspect of company culture.
Randhawa and Kaur (2005, p.239)	Innovativeness refers to the extent to which a woman was enthusiastic about adopting or trying an idea about her business.

This study focuses on individual innovativeness and specifically on that of the entrepreneur which is by nature, open, creative in his way of thinking and who exploits his innovative ideas to create added value within his company. Randhawa and Kaur (2005) indicate that entrepreneurship is a sensitive economic activity that demands specific human qualities such as innovativeness to carry out the business and it is for this reason that not all women are able of being an entrepreneur. In the entrepreneurial context, Innovativeness is the major behaviour of the entrepreneur. In sum, the concept of innovativeness is the behaviour that characterises the entrepreneur and which reflects his capacity for openness, creativity and sensitivity to reform innovative ideas. Building on the importance of the concept, this study elucidates it in a purely feminist approach. This paper is interested in factors reinforcing the innovativeness of Tunisian women entrepreneurs who have not yet setup their own businesses: the reason is that the creation stage, which mediates the entrepreneurial process, allows a better understanding of the entrepreneurial behaviour leading to the creation of a company. This paper aims to conceive a new integrative research model by introducing some mediating variables not previously considered in the field of women's entrepreneurship and for a better understanding of the innovativeness concept. The conceptual framework of the innovativeness and its determinants are described in the subsequent sections.

2.1 Education

There has been a wide agreement among academics that formal education plays a crucial role in entrepreneurial success (Lee and Tsang, 2001). It is an important part of human capital because it facilitates the recognition and exploitation of the opportunities available through the information received (Marvel and Lumpkin, 2007). Thus, Cheraghi et al. (2014) confirmed that education of women entrepreneurs affected their competencies, motives, networks and their predisposition for success. A study developed by Schiller and Crewson (1997) shows that the educational attainment of women entrepreneurs has a positive impact on their entrepreneurial performance. In this sense, Mumford and Gustafson (1988) find that education reinforces creative behaviour because there is an accumulation of skills and information involved in renewal and novelty generation. Moreover, Alaref et al. (2020) argued that entrepreneurship education have a short-term impacts on self-employment intention among Tunisian students. The medium-term results show that the impacts of entrepreneurship education were short-lived. There are no sustained impacts on self-employment or employment outcomes four years after graduation.

For Babalola (2009), the high level of education of women entrepreneurs promotes the development of innovative entrepreneurial behaviour: educational knowledge make the entrepreneur more exposed to new business ideas and therefore more innovative. Jiao et al. (2014) show that the entrepreneur's level of education is an explanatory factor for his or her innovativeness. Accordingly, this study proposes the following hypothesis:

H1a Education level (EDU) has a positive effect on innovativeness (INNOV).

2.2 Entrepreneurial training

Entrepreneurial training (ET) is important for business creation because even individuals who have an innovative behaviour may not create their businesses due to a lack of knowledge of the entrepreneurial environment and lack of entrepreneurial skills (Fairlie and Holleran, 2012). The results of a quantitative study conducted by Kisaka (2014) show that, rather than formal education, the level of entrepreneurial training is a true indicator of innovativeness. Therefore, this paper proposes the following hypothesis:

H1b Entrepreneurial training (ET) is positively associated with innovativeness.

2.3 Emotional intelligence

Emotional intelligence (EI) is the transfer of emotional information by the individual with himself and with others to be able to manipulate the circumstances of life (Wexler, 2000). The concept of EI is rarely studied in relation to entrepreneurship. Salleh et al. (2020) argued that 'emotional intelligence' is a key factor to ensuring entrepreneurial success among female entrepreneurs. Among the few studies, that of Dixit and Moid (2015) indicates that women entrepreneurs are generally more hanged to mobilise their emotions in the decision-making process. Thus, Quintillán and Pena-Legazkue (2019) found that entrepreneurs' emotional intelligence stimulate the choice of venture internationalisation during economic recession. Moreover, Fakhreldin and Hattab (2015) conclude that the success of the company depends on the EI of its creators since it develops behaviour

based on proactivity and innovation. Ngah and Salleh (2015) examine the effect of EI of Malaysian women and men entrepreneurs on their innovativeness. The results of this empirical study show that the success of the entrepreneur is the result of his creativity and his propensity to innovate and this is conditioned by his level of EI. In sum, the more the entrepreneur has a high level of EI, the more unique and innovative it will be. Accordingly, this study proposes the following hypothesis:

H2 Emotional intelligence (EI) is positively related to innovativeness.

2.4 Internal locus of control

Those who believe that their own behaviour and effort determine the circumstances of their lives are characterised by their internal locus of control (Rotter, 1966). Many studies on entrepreneurial behaviour were performed to investigate the support of ILC for entrepreneurial intention (Arkorful and Hilton, 2021; Tentama and Abdussalam, 2020). The results of the study conducted in the Australian context by Bennett and Dann (2000) show that women entrepreneurs have a very high level of internal locus of control (ILC), which enables them to manage well their businesses. An empirical study conducted by Babalola (2009) confirms that the level of ILC has a powerful effect on entrepreneurial innovative behaviour. Women entrepreneurs who believe in their ability to control the events of their lives mobilise more know-how to achieve the desired situation and are more innovative than others. In addition to this study, a research carried out by Utsch and Rauch (2000) show that ILC is one of the essential psychological traits in determining innovativeness: those with a high level of ILC are more open to newness and always trying to introduce it. Therefore, this study proposes the following hypothesis:

H3 Internal locus of control has a positive impact on innovativeness.

2.5 Entrepreneurial alertness

Entrepreneurial alertness (EA) is the capacity that guides the entrepreneur towards supreme opportunities and which is likely to develop gradually (Tang et al., 2012). Jiao et al. (2014) examine the effect of entrepreneurial alertness on the innovativeness of entrepreneurs from a new angle, by introducing the notion of knowledge management; according to them, entrepreneurial vigilance affects the entrepreneurs innovativeness through the knowledge acquired. Gözükara and Çolakoğlu (2016) find that the individual's ability to recognise the opportunities available in his environment reinforces his innovativeness. Based on his study carried on 385 small and medium-sized enterprises (SMEs) in Ghana, Adomako (2021) found that entrepreneurial alertness affect positively firm product innovativeness. Recently, Zhao et al. (2021) argued that entrepreneurial alertness enables business model innovation in Chinese firms. Accordingly, this paper proposes the following hypothesis:

H4 Entrepreneurial alertness is positively associated with innovativeness.

2.6 Entrepreneurial self-efficacy

Various studies confirmed that entrepreneurial self-efficacy is positively associated with entrepreneurial intentions (Santos and Liguori, 2019; Osiri et al., 2019) and

entrepreneurial orientation (Wayne et al., 2021; McGee and Peterson, 2019). Through their combined study, Chen et al. (1998) deduce that entrepreneurial self-efficacy (ESE) characterises entrepreneurs more than managers. Krueger and Dickson (1994) conclude that the entrepreneur's perception of his or her ability to succeed the tasks orientates its entrepreneurial behaviour. Babalola (2009) discusses the determinants of the entrepreneurial innovative behaviour of Nigerian women entrepreneurs. The results show that the higher ESE women entrepreneurs have, the more innovative they are: confidence in their ability to succeed leads them to differentiate themselves by their ideas and actions, to adopt a creative approach and to renew themselves. In this sense, Neck et al. (1999) demonstrate that the performance of the entrepreneur that corresponds to his risk-taking, his proactivity and especially his innovativeness is determined by his level of ESE. In addition, Ahlin et al. (2014) approve that the higher the feeling of ESE in the individual, the more it is oriented towards creativity and innovation. In the Turkish context, Kumar and Uzkurt (2010) deduce that ESE positively affects the innovativeness of professionals. Therefore, this leads to the following hypothesis:

H6 Entrepreneurial self-efficacy positively influences innovativeness.

2.7 Social networks

Presutti et al. (2020) argued that social capital could be exploited in international context to allow higher level of innovation and to expand business into foreign markets. In their study carried on 142 Chinese entrepreneurs, Ma et al. (2020) found a positive effect of social networks especially business ties and political ties on entrepreneurial opportunity recognition. Moreover, Muller and Peres (2019) confirmed the impact of social network structure on organisational innovation adoption. Commonly, social networks embody four types of social ties: personal social networks (PNET), business social networks (BNET), professional forums (PFORUM) and mentors (MENTOR) (Ma et al., 2020). Ozgen and Baron (2007) point to the idea that a vigilant entrepreneur is one who has a high level of entrepreneurial self-efficacy (ESE) developed through his interaction with his personal and professional networks (business, mentors and professional forums): a positive correlation between personal networks (PNET) and the ESE is deducted. Bratkovič et al. (2012) find in their quantitative study of a small sample of men and women entrepreneurs from small businesses in Slovenia that entrepreneur's personal social networks promote his feeling of ESE. In addition, Chen et al. (1998) emphasise that environmental support in terms of resources is fundamental to the development of the ESE. Fernández-Pérez et al. (2014) find that there is a positive relationship between the various social networks (personal, business, mentors and professional forums) and the level of ESE. Also, Javed et al. (2016) indicate that the perception of support from personal and professional social networks reinforces the ESE of the entrepreneur.

Accordingly, the following hypotheses are proposed:

H5a Personal networks (PNET) have a positive effect on entrepreneurial self-efficacy.

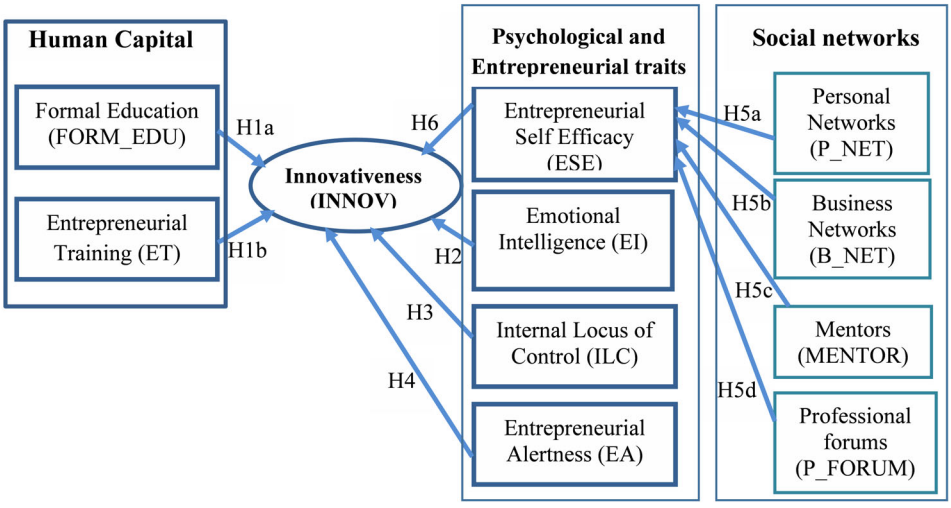
H5b Business networks (BNET) are associated positively with entrepreneurial self-efficacy.

H5c Mentors (MENTOR) are positively related to entrepreneurial self-efficacy.

H5d Professional forums (PFORUM) have a positive impact on entrepreneurial self-efficacy.

The integrated model including all mediating variables can be illustrated in the proposed research model in Figure 1.

Figure 1 Structural research model (see online version for colours)



3 Research methodology

3.1 Measurement development

During the period between December 2018 and early July 2019, the questionnaire was sent by mail to 317 women entrepreneurs incubated during the pre-creation stage in 24 Tunisian business incubators and in 24 business centres. Firstly, the response rate was very low (3.47%). Four weeks later, the questionnaire was sent again to women entrepreneurs who did not firstly respond which improve the response rate to 9.77%. Besides, we improve the response rate to 15 % by using phone calls. Lastly, we seized the opportunity of the Africa Woman Innovation and Entrepreneurship Forum held in Tunisia on 21–22 June 2019, to administrate the questionnaire through face-to-face interviews. As a result, the final rate of response was 87.06% (276 of 317 women entrepreneurs).

The use of structural equation modelling (SEM) necessitates a sample size between 200 and 400 to get accurate results (Hair et al., 2006). Moreover, Kline (2016) argued that the sample size for SEM must be superior than 200. The collected test data were used for the exploratory factor analysis (EFA) and reliability analysis with SPSS 25.0.

Descriptive statistics about the respondents' demographics is listed in Table 2. The demographic characteristics of our sample illustrate different demographic factors, including gender, age, business activity, diploma and education background.

The study found the vast majority of the sample respondents have an age between 25 and 40 years (82.97%) and over half of them was single (57.24%) and only 4.34% are

divorced. While the majority of the women surveyed are well-educated (89.85%), a small minority are undergraduated (5.7%). Furthermore, 39.49% of the sampled women want to operate their business in the service sector, while 29.34% of them are looking to carry on their business in industrial sector. However, 11.95% of women entrepreneurs are oriented towards healthcare sector. A small minority of surveyed women wants to start agriculture or tourism business (5.43%).

Table 2 Sample demographics (n = 276)

Measures	*Items*	*Frequency*	*Percentage %*
Organisation of incubation	Business incubator	171	61.95
	Business centre	105	38.04
Region of implantation	North	127	46.01
	East	88	31.88
	West	33	11.95
	South	28	10.14
Age	Under 25	31	11.23
	25–40	229	82.97
	40 or above	16	5.7
Marital status	Single	158	57.24
	Married	106	38.40
	Divorced	12	4.34
Educational level	Undergraduate	16	5.7
	Higher education	248	89.85
	Vocational training	12	4.34
Business activity	Services	109	39.49
	Industry	81	29.34
	Agriculture	15	5.43
	Commerce	23	8.33
	Tourism	15	5.43
	Health and healthcare	33	11.95

3.2 Measures

The measurement of variables reduces their ambiguity since they pass from a latent construct to an observable and measurable one. The questionnaire included 31 questions relating to innovativeness constructs and its determinants. There are 11 constructs in this study. For the operationalisation of constructs, the measurement items were formulated as a five point Likert scale, ranging from 1 'strongly agree' to 5 'strongly disagree', Except the two constructs of formal education level (Babalola, 2009; Jiao et al., 2014) and entrepreneurial training (Kisaka, 2014) are quantitative variables.

The scale used to measure the construct of innovativeness is a merger between the scale proposed by Peterson and Seligman (2004) and the one proposed by Lee and Ashton (2004). It was been validated by Wagener et al. (2010), and an adequate level of reliability is obtained (Cronbach's α: 0.78). The variable of *entrepreneurial self-efficacy*

(ESE) is measured using the scale proposed by Schyns and von Collani (2002) and validated by Wagener et al. (2010). The value of the Cronbach's alpha is 0.74, which is an index of the scale reliability.

Awwad and Kada (2012) developed the measurement scale of the construct emotional intelligence (EI). The Cronbach alpha associated with this scale is 0.70, which shows its reliability. The construct entrepreneurial alertness (EA) is measured referring to the work of Busenitz and Barney (1997), and validated with other authors (Ko and Butler, 2003; Jiao et al., 2014). The scale of entrepreneurial alertness demonstrated a very good reliability (Cronbach's α: to 0.84). This construct comprises four items. The *internal locus of control* construct scale is proposed by Tsai et al. (2008) and validated by Hsiao et al. (2015). It comprises three items and demonstrated a fair reliability (Cronbach's α: 0.668). For the social network construct scale is developed by Sequeira et al. (2007) and validated by Ozgen and Baron (2007). This scale refers to entrepreneur perception of the support received from various networks, namely: the personal networks that constitute strong links and professional networks (business networks, mentors and professional forums) forming the weak links. The *personal networks* variable is measured by three items and demonstrated an adequate level of reliability (Cronbach's α: 0.830). While, *business networks* scale comprises four items and demonstrated a high reliability (Cronbach's α: 0.831), the *mentors* construct is measured according to three items and demonstrated a very good reliability (Cronbach's α: to 0. 956). The variable *professional forums* refers to the entrepreneur's perception of the support, information provided and skills acquired during participation in seminars, conferences, etc. The scale adopted comprises three items. The Cronbach's alpha associated with this scale is 0.865, thus showing a very high reliability.

4 Results

This study outlines a research model with one latent construct, which is measured by four variables. We use SEM as a flexible tool in examining causal relationships between multiple-item constructs (Kline, 2016). The advantage of SEM analysis consists of flexible rules and less measurement mistakes allowed by some indicators per construct (Kline, 2016). Before testing our research model, we accomplished manipulation to validate the treatment. As a result, before testing our latent structural model (Anderson and Gerbing, 1988), we use a two-step process to identify a measurement model in the confirmatory factor analysis (CFA).

4.1 Measurement model validation

We refer to CFA to assess our measurement model and to confirm validity and reliability (Brown, 2015). All goodness-of-fit indices for the initial measurement model indicated acceptable fit levels. As a result, the chi-square/d.f. ratio (χ^2/d.f.) of 1.85, the goodness of fit index (GFI = 0.93), the adjusted goodness of fit index (AGFI = 0.94), the normed fit index (NFI = 0.95), Bollen's incremental-fit index (IFI = 0.96), the comparative fit index (CFI = 0.95) and the root-mean-squared error of approximation (RMSEA) is about 0.04.

To evaluate the reliability of the constructs we calculate Cronbach's α and in order to measure internal consistency we determine composite reliability (CR) (Fornell and

Larcker, 1981). In fact, for a construct to have good reliability, Cronbach's α should be superior to 0.7, while internal consistency (CR) should be at least 0.7 (Hair et al., 2006). Table 3 indicates a good reliability and shows that all values exceeded generally accepted values. Construct validity includes convergent validity and discriminant validity. Convergent validity measures whether items effectively reflect their corresponding factors (Brown, 2015).

Table 3 Standardised item loadings, AVE, CR and Cronbach's α values.

Constructs	*Items*	*Standardised item loading*	*CR*	*AVE*	*Cronbach's α*
Innovativeness	INNOV1	0.858	0.8742	0.7341	0.850
	INNOV2	0.846			
	INNOV3	0.838			
Emotional intelligence	EI1	0.836	0.9565	0.8871	0.946
	EI2	0.822			
	EI3	0.932			
	EI4	0.928			
	EI5	0.907			
Internal locus of control	ILC1	0.836	0.8432	0.6564	0.824
	ILC2	0.834			
	ILC3	0.828			
Entrepreneurial alertness	EA1	0.886	0.8675	0.7332	0.843
	EA2	0.866			
	EA3	0.843			
	EA4	0.837			
Entrepreneurial self-efficacy	ESE1	0.941	0.942291	0.8339	0.944
	ESE2	0.886			
	ESE3	0.849			
Personal networks	P_NET1	0.892	0.9203	0.7731	0.844
	P_NET2	0.879			
	P_NET3	0.874			
Business networks	B_NET1	0.876	0.9115	0.7525	0.832
	B_NET2	0.871			
	B_NET3	0.866			
	B_NET4	0.852			
Mentor	MENTOR1	0.862	0.9321	0.7753	0.832
	MENTOR2	0.854			
	MENTOR3	0.887			
Professional forums	P_FORUM1	0.874	0.9365	0.7859	0.857
	P_FORUM1	0.867			
	P_FORUM1	0.843			

Table 4 The square roots of AVEs and factor correlation coefficients

Construct	*INNOV*	*ESE*	*EI*	*ILC*	*EA*	*P_NET*	*P_NET*	*P_NET*	*P_NET*	*EDU*	*ET*
INNOV	.843										
ESE	.157***	.929									
EI	.028*	.107**	.956								
ILC	–.097**	–.068*	.003*	.930							
EA	.056*	.065*	.052*	–.045*	.927						
P_NET	.037*	–.160***	.051*	.056*	.087*	.903					
B_NET	.676***	.437***	.249***	.097*	.236***	.074*	.824				
MENTORP	.094*	.171***	.083*	–.385***	.024*	.748***	.165***	.814			
P_FORUM	–.065*	–.050*	–.048*	–.267*	–.020*	.316***	–.029*	–.314***	.876		
EDU	–.066*	–.045*	–.061*	–.345*	–.012*	.015*	–.618***	–.702***	.613***	.872	
ET	.088*	–.172***	.062*	.367***	.125***	.736***	.154***	.084*	–.058*	–.078*	.924

Notes: *p < 0.05; **p < 0.01; ***p < 0.001.
Values on diagonal are the square root of average variance extracted (AVE) between the constructs and their measures. However, off-diagonal values are correlations between constructs.

To evaluate the convergent and discriminant validity of the constructs' measurement we use average variance extracted (AVE). Moreover, to confirm convergent validity, the factor loading of every item should be superior to 0.7, and each construct should have the CR value larger than 0.7, and the AVE value greater than 0.5 (Fornell and Larcker, 1981). As presented in Table 3, all factor loadings for the items are greater than 0.7 and were significant at the 0.001 level, all AVEs are superior than 0.5 and the CRs exceeded 0.7. Consequently, the scale showed good convergent validity. Furthermore, to measure if two factors are significantly different we use discriminant validity (Kline, 2016).

Discriminant validity is shown when measurement items load more strongly on their assigned construct rather than on the other constructs in the CFA, and when the square root of the AVE of each construct is superior to its correlations with the other constructs (Hair et al., 2006). Table 4 indicated that the square root of the AVE for each construct is greater than the correlation shared among constructs in the research model, thus providing evidence of discriminant validity.

4.2 Structural model validation

Once finding an appropriate measurement model, we apply SEM approach to test our hypotheses described in our research model. While using the structural model, we determine if the suggested conceptual model was proposing a suitable fit to the empirical data. Table 5 associates both recommended and real values of the fit indices and showing that the model has an acceptable fit to data (Kline, 2016). In fact, the chi-square/d.f. ratio (χ^2/d.f. = 1.80), the GFI is about 0.92, AGFI = 0.93, NFI = 0.96, IFI = 0.97, CFI = 0.97 and RMSEA is about 0.03.

Table 5 Comparison of model fit indices for measurement model and structural model

Fit indices	*Criterion*	*Measurement model*		*Structural model*
		Initial model	*Respecified model*	
χ^2/d.f.	< 3.00	1.85	1.73	1.80
GFI	> 0.9	0.93	0.92	0.92
AGFI	> 0.9	0.94	0.93	0.93
NFI	> 0.9	0.95	0.97	0.96
IFI	> 0.9	0.96	0.98	0.97
CFI	> 0.9	0.95	0.98	0.97
RMSEA	< 0.06	0.04	0.03	0.03

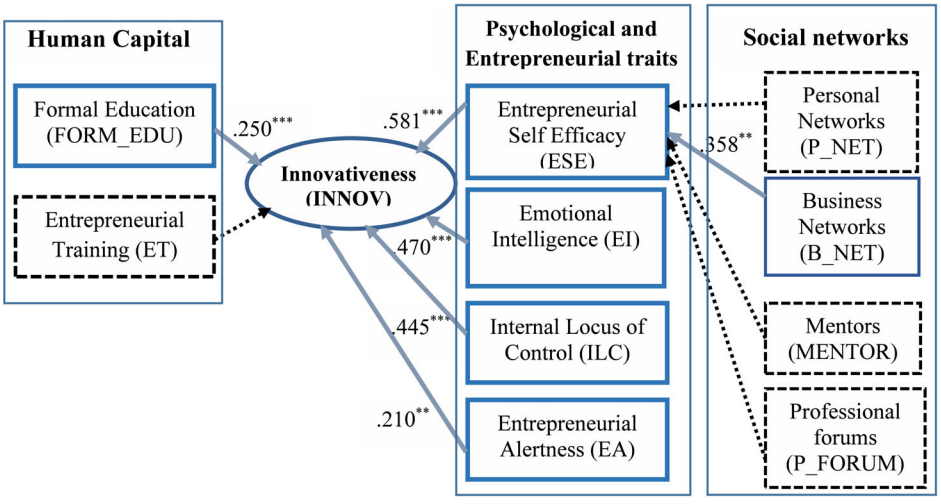
The paper hypothesises that human capital variables (formal education and entrepreneurial training) and personality traits variables (emotional intelligence, internal locus of control and entrepreneurial alertness) would have positive and direct effects on innovativeness. In addition, social networks variables (personal networks, business networks, mentors and professional forums) are predicted to have a positive and indirect effect on innovativeness through ESE. All the findings of the structural model analysis are detailed in Table 6.

Table 6 Results of hypothesis testing

No.	*Hypothesised path*	*Estimate*	*S.E.*	*C.R.*	*P value*
H1a	Formal education → Innovativeness	.250	.036	5.618	.000***
H1b	Entrepreneurial training → Innovativeness	–.103	.013	–6.486	.231ns
H2	Emotional intelligence → Innovativeness	.470	.067	5.534	.000***
H3	Internal locus of control → Innovativeness	.445	.046	15.643	.000***
H4	Entrepreneurial alterness → Innovativeness	.210	.018	7.644	.004**
H5a	Personnel networks → Entrepreneurial self-efficacy	.050	.023	12.188	.685ns
H5b	Business networks → Entrepreneurial self-efficacy	.358	.012	11.432	.003**
H5c	Mentors → Entrepreneurial self-efficacy	–.121	.017	–10.617	.327ns
H5d	Professional forums→ Entrepreneurial self-efficacy	.107	.014	.045	.374ns
H6	Entrepreneurial self-efficacy → Innovativeness	.581	.013	8.834	.000***

Note: *p < 0.05, **p < 0.01, ***p < 0.001 and ns – not significant.

Figure 2 The validated structural model (see online version for colours)



The path coefficients of Hypotheses H2, H3 and H6 were significant at a level of $p < 0.001$, indicating support for these hypotheses. The path coefficient of Hypotheses H1a, H4 and H5b was significant at a level of $p < 0.01$, thus indicating support for theses hypothesis. However, Hypotheses H1b, H5a, H5c and H5d were rejected. Turning first to human capital variables, the results show that formal education (FORM_EDU) is positively associated with Innovativeness ($\beta = 0.250$, $p < 0.001$). Interestingly, all constructs of psychological and entrepreneurial traits have a positive and direct effect on innovativeness. Consequently, the construct emotional intelligence (EI) was found to have the largest direct influence on innovativeness ($\beta = 0.470$, $p < 0.001$) followed by internal locus of control (ILC) ($\beta = 0.445$, $p < 0.001$) and entrepreneurial alertness (EA) ($\beta = 0.210$, $p < 0.01$). Moreover, the latent construct entrepreneurial self-efficacy (ESE) was found directly and positively associated with innovativeness ($\beta = 0.581$, $p = 0.000$). Furthermore, this study does not support the hypothesised

relationships between, on one hand, personal networks (PN), mentors (MENTOR), professional forums (P_FORUM) and, on the other hand, entrepreneurial self-efficacy (ESE) but, it supports the link between business networks (B_NET) and entrepreneurial self-efficacy ($\beta = 0.358$, $p = 0.003$). Consequently, the indirect effect of business networks on innovativeness through entrepreneurial self-efficacy is verified in this study. A full summary of significant relationships between constructs is reported in Figure 2.

5 Discussion

This paper aims to address the determinants of innovativeness of female entrepreneurship by elucidating the mediating role of entrepreneurial self-efficacy. Structural equation modelling technique was applied to examine survey data collected from Tunisian women entrepreneurs who are in the creation stage of a new business venture. There are four important findings.

First, while the study fails to support a significant direct relationship between entrepreneurial training and innovativeness, it supports the positive effect of formal education on innovativeness. This finding is consistent with the findings of Mumford and Gustafson (1988), Babalola (2009) and Jiao et al. (2014), who found that education enhances innovative behaviour. According to these authors, formal education promotes creativity and self-ideas for the entrepreneur. Moreover, our finding corroborate with those of Osman and Ngah (2016) who reported that intellectual capital can be embodied in knowledge improvement, which contribute to innovation in Malaysian women-owned SMEs. In the same way, our result is in accordance with the recent study carried out in Slovenia by Vadnjal (2020) who argued that women with higher level of human capital and education are likely to be more innovative. In fact, Tunisian women entrepreneurs have an innovative spirit owing to their high level of education (89.85% of cases in our sample). The absence of a direct impact of entrepreneurial training on innovativeness is not in line with findings of Kisaka (2014) and Fairlie and Holleran (2012) who indicated that the level of entrepreneurial training is an indicator of innovativeness. This finding could be explained by the fact that innovativeness is an already developed behaviour embodied in the entrepreneur's culture capital independently of the skills acquired during entrepreneurial trainings (Kim et al., 2019). Furthermore, in their study of the in Tunisia, Alaref et al. (2020) found that there are no sustained impacts of entrepreneurship education on self-employment four years after graduation. This fact could possibly explain the weak tendency to be innovative among Tunisian women entrepreneurs once a higher entrepreneurial training level is achieved.

Second, the paper supports a direct and positive link between, on one hand, emotional intelligence, internal locus of control and entrepreneurial alertness and, on the other hand, innovativeness. Indeed, our findings are in accordance with those of Ngah and Saleh (2015) who concluded that emotional intelligence makes the entrepreneur more apt to secrete new ideas and be more creative. Furthermore, we found that the ILC is an explanatory factor of the innovativeness, which is consistent with the findings of Mueller and Thomas (2001), Utsch and Rauch (2000) and Babalola (2009). Consequently, the women entrepreneur who believes in her abilities to act on the abrupt events that hinder her is more willing to be innovative and creative in order to be able to act and succeed. Also, the existence of a positive and significant effect between entrepreneurial alertness

and innovativeness is in accordance with the findings of Gielnik et al. (2014), Gözükara and Çolakoğlu (2016) and Jiao et al. (2014). Our finding aligns with those of Zhao et al. (2021) who reported that entrepreneurial alertness affects business model innovation.

From another perspective, the overall results regarding the relationship between constructs of social networks and entrepreneurial self-efficacy are not consistent with findings of Ozgen and Baron (2007), Fernández-Pérez et al. (2014) and Javed et al. (2016). However, Baranik et al. (2018) have conducted a study among 84 Tunisian women entrepreneurs and they found that social capital especially personal network or 'wasta' in Arabic language, are related to the female entrepreneurial success. In addition, they suggest that social capital is a crucial asset for Muslim women entrepreneurs (Ghiat, 2020). Our finding is also in line with the results obtained by Vadnjal (2020) who reported the evidence of the effect of social networks and friends on the innovativeness behaviour of Slovenian women entrepreneurs.

The construct business networks (B_NET) is found positively associated with entrepreneurial self-efficacy (ESE). Moreover, women entrepreneur's interaction with business networks (suppliers, partners, investors and competitors) allows her to believe in her ability to succeed and to achieve her goals, and that encourages her to be more creative and innovative. However, mentor support and intervention in professional forums (P_FORUM) do not increase the sense of entrepreneurial self-efficacy. This result is consistent with the study conducted by Morched and Jarboui (2019) showing that the main factors affecting the success of women entrepreneurs in Tunisia are self-fulfilment, risk taking and willingness to be independent. Finally, last but not least, besides the direct links between psychological and entrepreneurial traits and innovativeness, this study has identified an indirect effect of business networks on innovativeness through entrepreneurial self-efficacy.

6 Conclusions, implications, limitations and future research

The theme of innovativeness among female entrepreneurs is not widely studied in the literature on gender and poses a number of significant challenges. In fact, understanding the concept of innovativeness and searching for its determinants is the purpose of this study. We apply structural equation modelling on an integrated model that includes original factor influencing directly and indirectly innovativeness. We conduct a Survey among 276 Tunisian women entrepreneurs' hosted in business incubators and business centres. Despite the limitations, this study has generated some interesting implications.

6.1 Implications

The originality of this study lies in the development of a new theoretical framework based on several important constructs that were not previously taken into account in research on women's entrepreneurship. This paper deals with a concept that enables innovation development among women entrepreneurs. It highlights the determination of factors reinforcing the innovativeness and provides recommendations on how to stimulate innovative entrepreneurial behaviour in developing countries. It is also interesting to point out that on the empirical level, the choice of the sample and the context is different and enriching the previous studies on women's entrepreneurship.

6.2 Limitations and future research

There are several limitations of this study. First, although this research scrutinise determinants of innovativeness among Tunisian women entrepreneurs, it is concentrated mainly on restricted factors such as social networks, human capital, psychological and entrepreneurial factors. Future studies could search for additional explicative variables that could better influence innovativeness. This paper is concerned with the person of the entrepreneur, and therefore with the individual innovativeness. Thus, future studies can explore organisational innovativeness and its determinants, in a purely feminist context.

Another limitation concerns the choice of research ground. The focus has been on a convenience sample drawn from support structures for business start-ups mainly business incubators and business centres which are under the Ministry of Industry. Future studies could be derived from other support organisations associated with other ministries (agriculture, employment, etc.). It is also important to provide some further comment on the representativeness of the findings. Although the size of the sample is more or less sufficient (n = 276), future studies could benefit from collecting data from other regions of Tunisia to obtain generalisable results. At least, innovativeness is a complicated and original concept. A qualitative approach or triangulation of data sources and samples is relevant for better understanding.

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