



Exploring determinants of entrepreneurial motivation among university students: Using Covariance-Based Structural Equation Modeling (CB-SEM)

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Abstract ;

The study aims to understand the influence of three factors (financial gain, passion for innovation and social recognition) on entrepreneurial motivation of Algerian students. Methodology: using a sample of 204 students and Covariance-Based Structural Equation Modeling (CB-SEM), we aimed to test the hypothesis regarding the relationships between intrinsic and extrinsic motivation and entrepreneurial motivation. Findings: The research reveals that the passion for innovation is the most influential factor with the financial gain closely following, and then social recognition. The study further suggests that education programs involving aspects of creativity and innovations; should be employed to enhance the students' entrepreneurial motivation.

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1. **Introduction**

In recent years, the question of how to foster entrepreneurial motivation within students has been a major interest point for educators, policymakers and researchers in Algeria because of the importance of entrepreneurship, both in the economic diversification and economic growth. With a reducing unemployment rates strategy, entrepreneurship becomes a viable career option. In this context, it is important to understand what motivates students toward entrepreneurial action, to be able to design effective educational programs that prepare future entrepreneurs. Based on Self Determination Theory (SDT)(Deci & Ryan, 1985), this study provides an analysis for the motivational determinants, which foster students' disposition to become entrepreneurial, in particular the effect of financial gain, passion for innovation and social recognition.

According to Self Determination Theory, people have both intrinsic (intrinsic or internal) and extrinsic (extrinsic or external) motivations and are engaged sustainably with activities such as entrepreneurship by their motivations (Ryan & Deci, 2000). This is especially so in Algeria, where students are facing various financial challenges owing to current economic conjuncture, and the financial incentives can help play a great extrinsic motivation in making them become entrepreneurs. Especially when studies show that financial incentives are

vital when and where students desiring to start their businesses are contemplating, given the aspiring jobs market(Parreira et al., 2018).

In addition, engagement in entrepreneur activities based on intrinsic motivations (such as curiosity and passion), seems to produce more enduring engagement(Debora et al., 2023). It is especially relevant for the Algerian context where increasing creativity and innovation is a key element to break the walls of sluggish employment pathways. Passion for innovation aligns with SDT's premise that it is self fulfilling on engaged in meaningful things and can meaningfully contribute towards the entrepreneurial intentions of students.

Another determinant of entrepreneurial motivation among the Algerian students is social recognition. Though it may not be as potent as personal benefits intrinsic motivators offer; the need for acceptance and recognition that comes with being an entrepreneur can inspire students to become business persons. Research evidences pointed that recognition and respect from society offers extrinsic motivation that affirms the students' desire to become involved in entrepreneurial initiatives(Karamanc et al., 2024).

Thus, our research adopts the following hypotheses to explore the relevance of these determinants of entrepreneurial motivation among students:

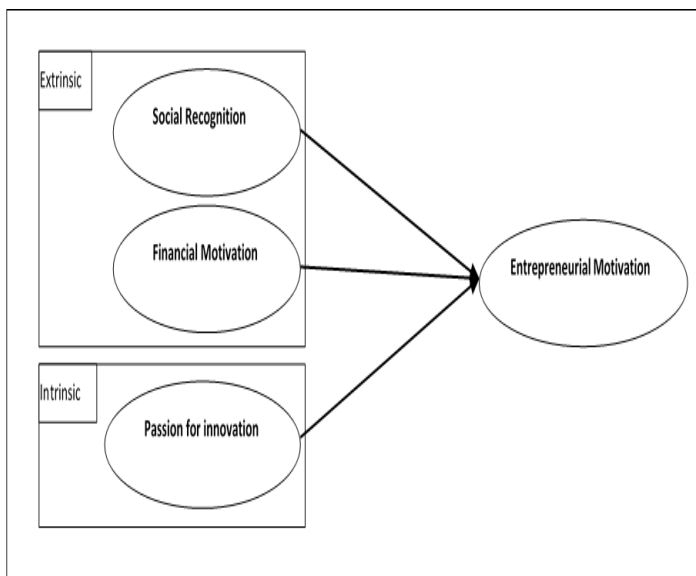
H1: Financial gain positively influences entrepreneurial motivation.

H2: Passion for innovation is strongly associated with entrepreneurial motivation.

H3: Social recognition also has a positive effect on entrepreneurial motivation.

This study empirically tests these hypotheses in the Algerian context by using a Covariance-Based Structural Equation Modeling (CB-SEM) and contributes to the existing body of works on entrepreneurial education and motivation, offering insights for strategies designed to enhance the potential for entrepreneurial intent of students.

Fig.1. Model



Source: By Researchers

2. Methodology:

2.1 Sample/Data

To explore the factors determining entrepreneurial motivation among the student population, a questionnaire was distributed to a sample of 204 students at the Higher School of Management Sciences in Annaba (Algeria). The choice of students from this school is justified by several reasons: the management specialties it offers, the inclusion of entrepreneurship education in the academic programs, and the entrepreneurship training provided by the incubator and the entrepreneurship development center (CDE) within the school.

2.2 Questionnaire survey

The development of the questionnaire was accomplished through several stages. A literature review on the subject was conducted to identify the determining factors of entrepreneurial motivation. The Self-Determination Theory (SDT) (Deci & Ryan, 1985) naturally emerged as a model explaining human motivation through intrinsic and extrinsic factors. The items of the questionnaire were grouped based on this approach into three intrinsic factors (Passion for Entrepreneurship, Desire to Face Challenges, Passion for Innovation) and three extrinsic factors (Financial Motivation, Social Recognition, Influence of External Expectations).

The items of the questionnaire were measured using a five-point Likert scale ranging from strong disagreement to strong agreement. In addition to factor analysis, the

reliability and validity of the questionnaire were verified using Cronbach's alpha, which measures the degree of internal consistency and the homogeneity of the items.

2.3 CB-SEM Approach

We modeled the existing relationships between the variables using Covariance-based Structural Equation Modeling (CB-SEM), which allowed us to calculate the strength of the relationships between the items and the latent variables they measure, as well as among these latent variables themselves.

First, we identified a measurement model, which enabled us to represent the relationships between the observed variables and the latent variables. This model specifies how the observed variables are linked to the underlying constructs they represent.

Secondly, we designed the structural model that represents the relationships between the latent variables. This model describes the causal relationships and associations between the latent variables and specifies The KMO value ($KMO = 0.839$) is greater than 0.50, indicating that the sampling adequacy criteria are met. The Bartlett's test of sphericity is statistically significant ($P < 0.05$), demonstrating that our

how these latent variables directly or indirectly influence each other through a series of paths. These paths represent the hypotheses that there are causal relationships.

Thirdly, we evaluated the proposed model based on a set of model fit indicators, such as assessing model fit using indices like CFI, RMSEA, SRMR, etc.

3. Data Analysis and Results

3.1 Exploratory Factor Analysis (EFA)

We conducted an Exploratory Factor Analysis (EFA) to identify the latent variables in the model of entrepreneurial motivation among students. Using the maximum likelihood method with Varimax rotation, we analyzed the factor structure and the correlation between the items included in the scale. The results of the rotated factor matrix are provided in the following tables:

Table 1. Indice KMO et test de Bartlett

Indice de Kaiser-Meyer-Olkin pour la mesure de la qualité d'échantillonnage.		,839
Test de sphéricité de Bartlett	Khi-deux approx.	882,008
	ddl	55
	Signification	,000

Source : Developed by researchers based on the SPSS outputs.

correlation matrix is statistically different from an identity matrix, as desired.

Table 2. Rotation of the factor matrix

	Facteur			
	1	2	3	4
MI9	,786			
MI8	,677			
MI7	,556			
MG2		,741		
MG3		,633		
MG1		,557		
RS5			,755	
RS6			,669	
RS4			,654	
MF2				,781
MF3				,645
Méthode d'extraction : Maximum de vraisemblance.				
Méthode de rotation : Varimax avec normalisation Kaiser.				
a. Convergence de la rotation dans 6 itérations.				

Source: Developed by researchers based on the SPSS outputs.

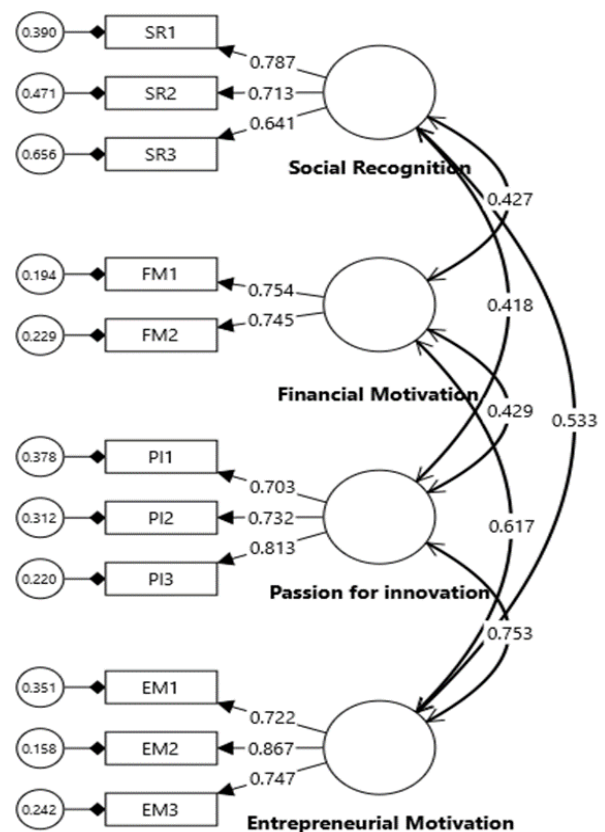
The results of the exploratory factor analysis allowed us to retain a solution based on 4 factors to model the relationships between entrepreneurial motivation and the factors (financial motivation, passion for innovation, social recognition). And to discard the other 3 factors on the basis of the rule of (Kaiser, 1960) which suggests keeping only the factors whose eigenvalues are greater than 1.0 as shown in the plot on (appendix 1).

Table 2 shows that all items are loaded on their respective factors. The four-factor solution explains 58.75% of the total variance. The results of the exploratory factor analysis indicate that our factors have a good level of validity. For further

validation, we employed Confirmatory Factor Analysis (CFA), which is discussed below.

3.2 Confirmatory Factor Analysis (CFA)

In order to conduct a confirmatory factor analysis (Gallagher & Brown, 2013), we used Smartpls4 software. The reliability, convergent validity and discriminant validity of the model (Figure 1) were tested as demonstrated by the data in Tables 3 and 4.

Figure 2. Measurement Model

Source: Smartpls4 outputs.

Variables/ Constructs	Items	Standardized Factor Loadings	Cronbach Alpha	Composite Reliability	Average Variance Extracted
Social Recognition	SR1	.787	.761	.756	.513
	SR2	.713			
	SR3	.641			
Financial Motivation	FM1	.754	.719	.719	.562
	FM2	.745			
	FM3	.678			
Passion for innovation	PI1	.703	.790	.792	.564
	PI2	.732			
	PI3	.813			
Entrepreneurial Motivation	EM1	.722	.817	.822	.610
	EM2	.867			
	EM3	.747			
Model Fit : RMSEA=.066, SRMR= .050, GFI= .940, CFI= .960					

Source: Developed by the researcher based on the outputs from SmartPLS 4.

According to the results of the Confirmatory Factor Analysis (CFA), the model shows good fit statistics, specifically an RMSEA of 0.066, an SRMR of 0.050, a GFI of 0.940, and a CFI of 0.96. These values align with the recommendations (RMSEA < 0.08, SRMR < 0.05, CFI > 0.90) based on the guidelines from Hu & Bentler (1999) and Browne & Cudeck (1992). The standardized factor loading of all items was greater than 0.60, and the AVE was also greater than 0.50, indicating good convergent validity (Avkiran & Ringle, 2018). The Cronbach's alpha and composite reliability for all variables were above 0.70, demonstrating that our variables had good reliability.

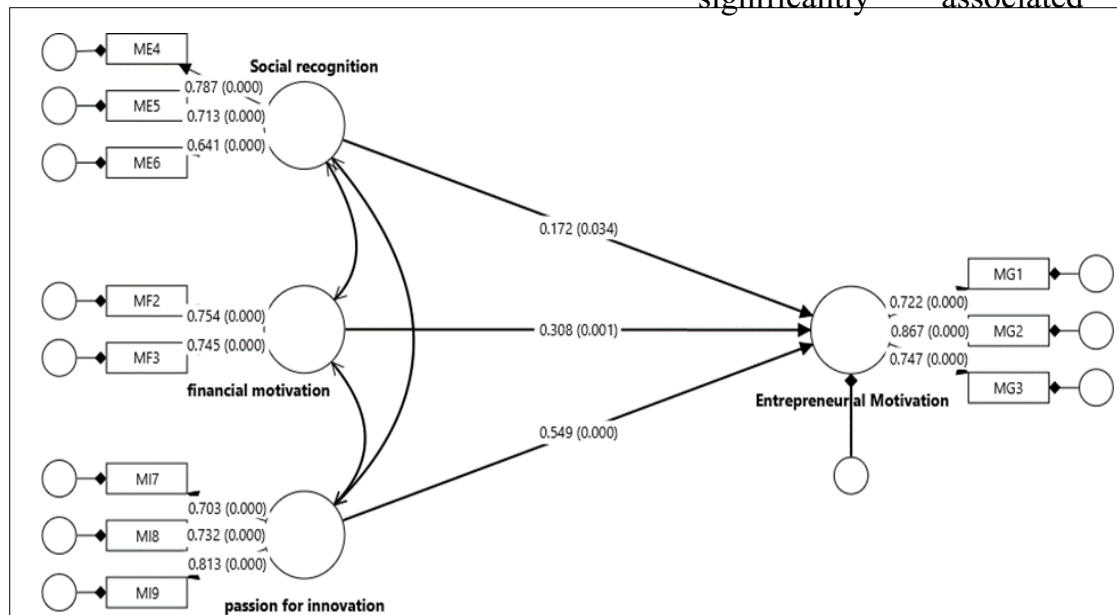
Table 4. Discriminant Validity

Discriminant Validity	Entrepreneurial Motivation	Financial Motivation	Passion for innovation	Social Recognition
Entrepreneurial Motivation	0.781			
Financial Motivation	0.617	0.750		
Passion for innovation	0.753	0.429	0.751	
Social Recognition	0.533	0.427	0.418	0.716

Source: Developed by the researcher based on the outputs from SmartPLS 4.

The requirement for good discriminant validity is that the square roots of the AVE written in bold on the diagonal are greater than the other values in their respective columns, which is respected as can be seen in Table 4. Therefore, the discriminant validity criteria of (Fornell & Larcker, 1981) are respected.

3.3 Structural Model (Hypotheses Testing)



Source: Smartpls4 outputs.

Table 5. Regression Weights

H. No.	Paths	Estimation	(STDEV)	T statistics	P values	Remarks
H1	Financial motivation -> Entrepreneurial Motivation	0.308	0.097	3.176	0.001	H1 Supported
H2	Passion for innovation -> Entrepreneurial Motivation	0.549	0.090	6.087	0.000	H2 Supported
H3	Social recognition -> Entrepreneurial Motivation	0.172	0.094	1.832	0.034	H3 Supported
Model Fit : RMSEA=.066, SRMR= .050, GFI= .940, CFI= .960						

Source: Developed by the researcher based on the outputs from SmartPLS 4.

According to the model fit indicators such RMSEA, SRMR, GFI and CFI, good model fitness is achieved.

The hypotheses resulting from the path analysis show that financial motivation is positively and significantly associated with entrepreneurial motivation ($\beta = .308$, $P < .05$). Passion for innovation is positively and significantly associated with entrepreneurial

motivation ($\beta = .549$, $P < .05$). Social recognition is positively and significantly associated with

entrepreneurial motivation ($\beta = .172$, $P < .05$). Based on these results, we accept all the hypotheses of the

study H1, H2 and H3.

4. Discussion and Conclusion:

The objective of this study was to identify the main determinants of entrepreneurial motivation among students based on Self-Determination Theory (SDT). The results revealed that both intrinsic and extrinsic motivational factor, namely, financial gain, passion for innovation, and social recognition, combine to play a significant role in strengthening students' entrepreneurial initiative.

H1: Perceived financial gain positively influences students' entrepreneurial motivation. ($\beta = .308, p < .05$).

The first affirmation that was advanced was supported by the findings of the study. This showed that there is a positive significant relationship between the objective of attaining financial gain through entrepreneurship and high entrepreneurial motivation.

Profit is one of the most recognized antecedents of entrepreneurship motivation according to (Debora et al. 2023); and university student target since they have many uncertain financial situations and career options (Ahmad et al., 2021). Some other researchers have proved that financial incentive is among the motivation factors that compel students to engage in entrepreneurship (Suparno & Saptono, 2018). The coefficient β equals 0.308, which shows that the connection between this variable and entrepreneurial motivation is significant and medium at the same time, therefore financial gain can be considered a reliable predictor of entrepreneurial motivation among students.

H2: Passion for innovation is strongly associated with entrepreneurial motivation. ($\beta = 0.549, p < 0.05$).

The passion for innovation and creativity stands as the strongest predictive factor in this model, with a coefficient of $\beta = 0.549$. Proposing that intrinsic factors act as key incentives for entrepreneurship activities more than extrinsic incentives. This passion for innovation can be fundamentally categorized under Self-Determination Theory (SDT) that describes that for one to remain optimally engaged in activities such as entrepreneurship, intrinsic motivation has to be encouraged (Ryan & Deci, 2000). As per SDT, the extrinsic motivation which is essential in keeping people engaged in their work in the long run includes things like curiosity, impulse for creativity and owning the wished outcome.

Furthermore, (Karamanc et al. 2024) found that while the study of intrinsic and extrinsic motivation in the context of entrepreneurial education revealed that students who participates in entrepreneurial training programs motivated by intrinsic reasons are more likely to develop the entrepreneurship mindset than the students who are motivated by extrinsic reasons. That is way it is important to consider this variable in order to encourage entrepreneurial intentions.

H3: Social recognition also has a positive effect on entrepreneurial motivation. ($\beta = .172$, $p < .05$).

Regarding social recognition, the analysis shows that it is also relevant for increasing motivation among entrepreneurs, still its impact is less significant ($\beta = 0.172$). Entrepreneurial students who are particularly motivated by social recognition or status associated with being an entrepreneur are likely to be more committed towards engaging in entrepreneurial processes.

Although it is a weaker predictor than financial gain and even less than the passion for innovation, social status, and respect associated with entrepreneurship cannot be underestimated. The extrinsic motivation incentives such social recognition, could be used to supplement intrinsic factors enhancing the student's involvement in the entrepreneurial process.

In summary, the study found that the motivation for financial gain is a moderate yet significant factor that showed that driven by financial needs students are more inclined towards entrepreneurship. More than all the above, the pull force that set the highest influence was the passion for innovation, proving the strength of intrinsic motivation in sustaining

engagement in entrepreneurial activities. Social recognition also has a positive effect, even if it is not as potent, on the motivation of the entrepreneur.

Finally, these results indicate that education programs also need to focus on passion for innovation and creativity for students as well as the financial benefits of becoming an entrepreneurship. It is, therefore, possible for institutions to cultivate practical project based on innovation and vocational education by training students on real entrepreneurial challenges, so they can cultivate their intrinsic motivation and ensure sustained engagements in entrepreneurial activities from theme.

Despite the fact that it is employed only for a sample of students in particular educational setting, the study opens a way for further research that applies this model for different populations to explore other factors of entrepreneurial motivation and to deepen the understanding of this phenomenon.

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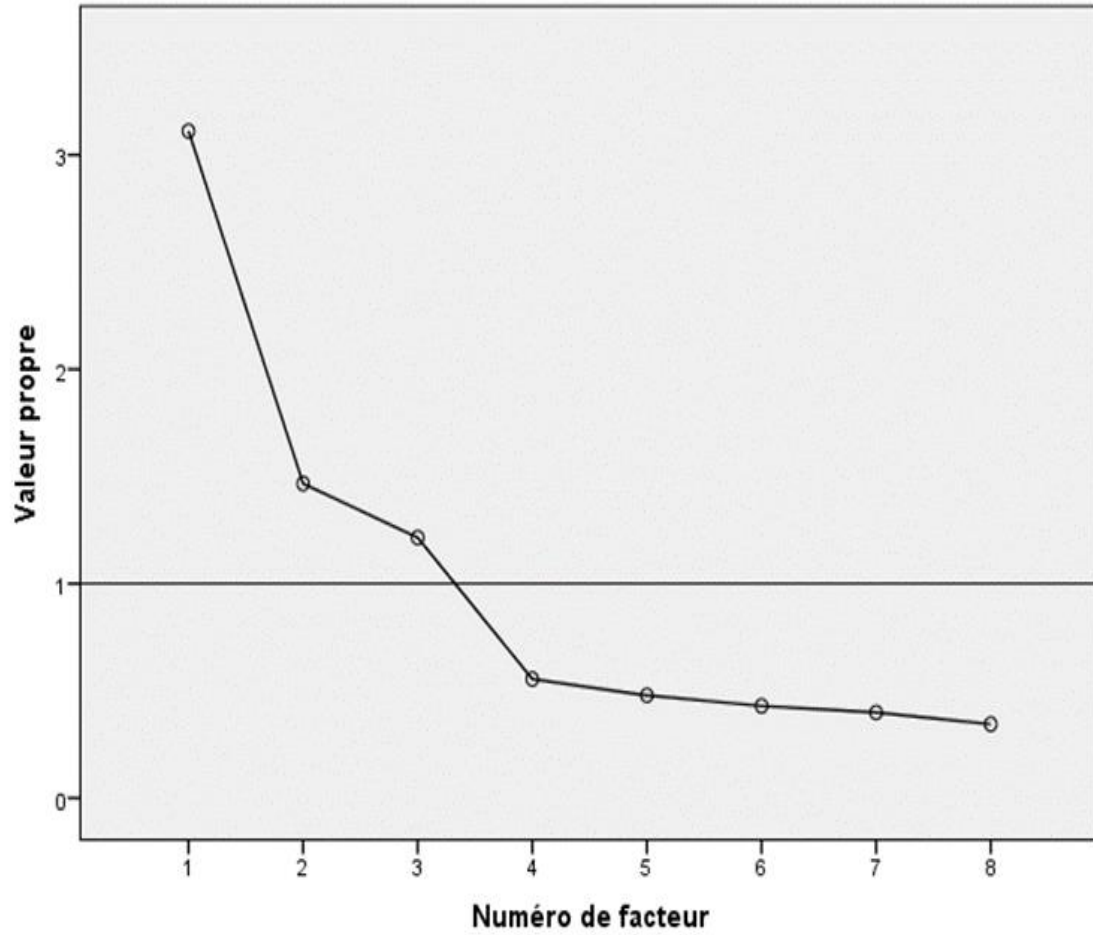
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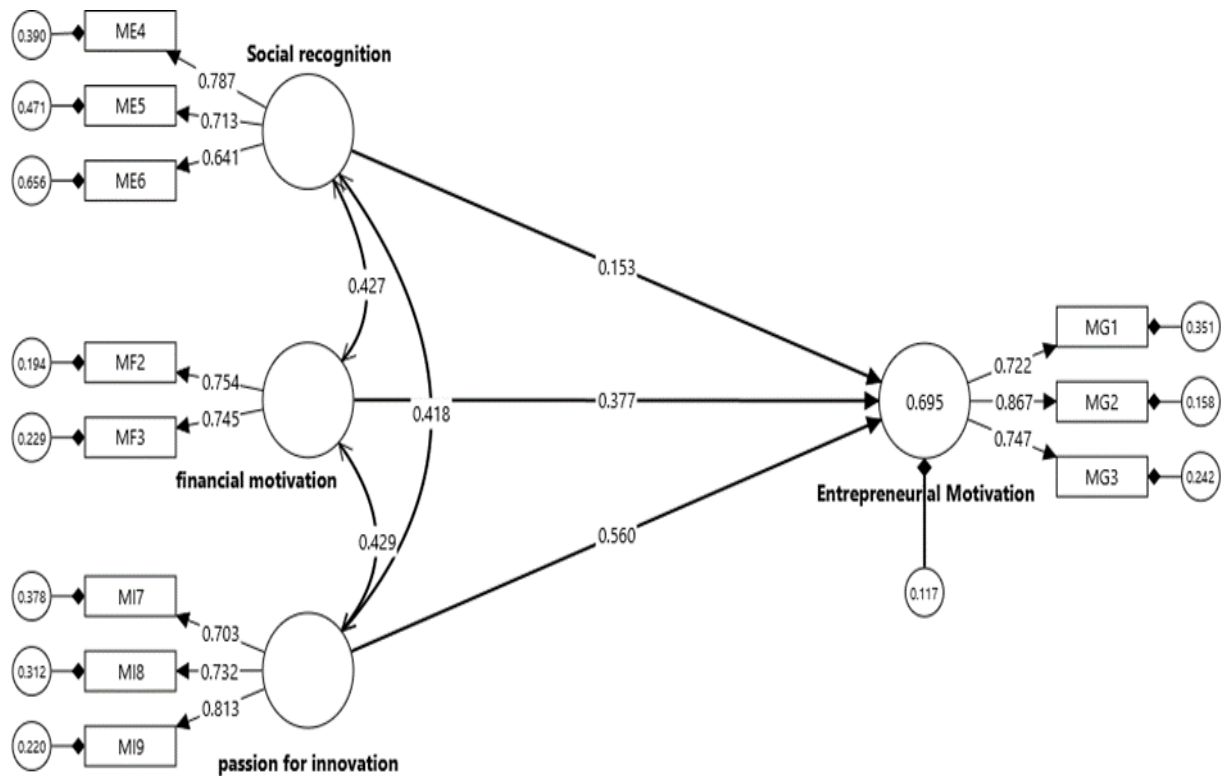
6. Appendices

Appendix I:

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Appendix II: Basic CB-SEM Algorithm Structural Model



Appendix III: Model Fit

	Estimated model	Null model
Chi-square	72.004	906.446
Number of model parameters	28.000	11.000
Number of observations	204.000	n/a
Degrees of freedom	38.000	55.000
P value	0.001	0.000
ChiSqr/df	1.895	16.481
RMSEA	0.066	0.275
RMSEA LOW 90% CI	0.042	0.260
RMSEA HIGH 90% CI	0.089	0.291
GFI	0.940	n/a
AGFI	0.896	n/a
PGFI	0.541	n/a
SRMR	0.050	n/a
NFI	0.921	n/a
TLI	0.942	n/a
CFI	0.960	n/a
AIC	128.004	n/a
BIC	220.911	n/a