

Exploratory Factor Analysis of Institutional Environment: An Evidence from Gender Perspective in China's Micro-ebusiness

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Abstract—This study proposes regulatory, normative, and cognitive dimensions and empirically investigates how these three dimensions take form in a measure of institutional environment from gender perspective. The study carried out the work within the micro-ebusiness sector in China and collected the data with 689 females and 357 males. Exploratory factor analysis (EFA) is used to test the dimensionality of institutional environment. It also used Cronbach's alpha to check the reliability of the intended measure. The findings show that the early scholars' measurement of the institutional environment in regulatory, normative, and cognitive dimensions still applies to Chinese males in the micro-ebusiness sector. However, the specific items regarding regulatory and normative form distinct factors of what mixed the two dimensions in female group. From the evidence of China, it challenges the widely recognized measurement of institutional environment, which need to be redesigned for females in regulatory and normative dimensions. The study outcomes provide a better understanding of how different the institutional environment was evaluated and functioned to female and male. It can help government departments reconsider and improve institutional environment to promote entrepreneurship from gender perspective. This new perspective would add some insights into the literature of micro-ebusiness and enhance the knowledge of the dimensionality of institutional environment.

1 INTRODUCTION

Micro-ebusiness just emerged with the application of internet technology in recent decades, the literature on ebusiness have already drawn attention to the impact of institutional environment on micro-ebusiness [1][2]. Considered as an effective way to create employment and eliminate poverty, micro-ebusiness can be defined as "start a business with small cost through e-commerce platforms" in China [3]. In 2011, Chinese internet media launched a "China Internet Micro-ebusiness Start-ups Plan", which introduced micro-ebusiness to the public for the first time. With the popularity of varied ebusiness platform, a large number of people started micro-ebusiness. In 2016, the number has exceeded 10 million, and women account for about 80% in this new sector. Especially the market scale of micro e-businesses via WeChat and other social ebusiness in China has been grown from 22,490 million Yuan RMB in 2013 to 980,430 million Yuan RMB in 2019, which has expanded nearly five times.

China's institutional changes have promoted the rise of micro-ebusiness entrepreneurship [4]. On the one hand, institutional environment has been improved yearly, giving more and more equal opportunity to individuals no matter male or female. On the other hand, in many traditional industries dominated by male, women started to take a

place in the ebusiness and present a better entrepreneurial performance. In the micro-ebusiness world, China has entered a new stage called "Her Era", which gives increasing power to females [5].

Empirical studies indicate that women are more likely to start their own businesses for survival with "refugee effect" as they are more dependent on informal networks and less able to use external institutional resources than men [6] [7]. Therefore, how to evaluate institutional environment differently from gender perspective is significant for policy improvement. In China's social context, do female and male perceive the institutional environment in the same dimension? This study proposes regulatory, normative, and cognitive dimensions and empirically investigates how these three dimensions take form in a measure of institutional environment to both female and male. With questionnaire data with 689 females and 357 males in China's micro-ebusiness sector, this study uses exploratory factor analysis (EFA) to test the dimensionality of institutional environment.

The paper is structured as follows. First it provides a brief overview of the institutional theory in regulatory, normative, and cognitive dimensions, which is widely recognized by academia. It then separately conducts exploratory factor analysis (EFA) to test the dimensionality of institutional environment to females and males. After

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presenting the statistical results, it discusses the findings and implications of this study.

2 LITERATURE REVIEW

In the theory of institution, institution can be described as relatively widely diffused practices, technologies, or rules of social interaction, it includes formal rules, laws and regulations, as well as informal rules in the form of customs, norms and culture [8]. It was widely considered that, behavior of individuals and organizations is embedded in and influenced by a broader environment, which is comprised of other organizations and governed by rules and norms. These are enforced either explicitly by the government in form of laws and regulations, or implicitly by often-subconscious compliance with culturally embedded social norms [8] [9].

Entrepreneurial institutional environment is the connection between the entrepreneur and the external environment. It is a series of internal and external factors that influence the whole process of entrepreneurship [10][11]. The literature is rich with works addressing the institutional environment and its measurement. The most-widely applied measurement is to categorize institutional environment in three dimensions, namely the regulative, normative, and cognitive institutional environments [9][12]. The regulatory institutional environment has been defined as a formal system of rules, laws and regulations, which constrains or promotes entrepreneurial behavior. The normative environment refers to the degree to which a country's residents admire and perceive entrepreneurial thinking and innovative activities as important. And the cognitive institutional environment relates to the culturally constructed rules and meanings, that shape entrepreneurial behavior [9]. The three pillars of institutional environment impact entrepreneurial behavior by entrepreneurs' cognitions and attitudes and their access to resources [13]. From the perspective of efficiency, institutional changes initiated by regulatory and normative institutional elements tend to be more formal and easily lead to collective behavior, which makes social actors take expedient actions to gain legitimacy. According to Krueger et al. (2000) [14], the cognitive institutional environment creates mechanisms that shape the context of social entrepreneurial ventures through decision making. Entrepreneurs' cognition on the legitimacy, risk-taking and market information is perceptive and beneficial to entrepreneurial success.

In China's social context, the booming of internet economy led to rapid institutional changes, which supplied business opportunities to women. However, in traditional Chinese culture, the dual gender role expectations of women in modern society have greater impact on entrepreneurship [15]. In the male dominated discourse, women's obedience and sacrifice are still emphasized, which hindering women's independent personality and entrepreneurial ability [16]. Consistent with previous literature, the institutional environment acts as both a barrier and an opportunity for entrepreneurship [17]. On the one hand, an effective institutional environment can promote entrepreneurs' ability to form social networks in

complicated entrepreneurial ecosystem, so as to improve entrepreneurial performance. On the other hand, imperfect institutional environment would become the bottleneck restricting women to achieve business success [18].

In recent years, the literature has shown an ongoing debate on how to improve institutional environment in practice, especially regarding the issue of its dimensionality in emerging sectors [19][20]. Furthermore, the literature includes a different taxonomy of theories and calls for more studies based on micro-ebusiness settings. Thus, contributing to the literature on institutional environment in China's micro-ebusiness, this study provides a better understanding of how different the institutional environment was measured from gender perspective, which helps government departments reconsider and improve institutional environment in the emerging sectors.

3 DATA COLLECTION AND VARIABLE MEASURE

3.1 Sample selection and data collection

According to the classification of China's national economic sectors (GB/T 4754-2017) issued by China's National Bureau of Statistics, the small and micro business in retail industry meet the criteria as follows: the number of employees is less than 10, and the average monthly income is less than 1 million RMB Yuan.

This study takes the female micro-ebusiness entrepreneurs in China as the research sample, and defines the selection criteria as follows. First, entrepreneurial activities through internet micro-ebusiness platform like WeChat and Taobao, focusing on micro business. Second, women and men who have been engaged in micro-business activities for more than three months and above the age of 18 years old. From August 2019 to August 2020, by interviewee-driven sampling method, 1500 questionnaire was distributed through face to face interview, e-mail delivery, WeChat and other e-business platforms. With effective recovery rate at 70%, the 689 female samples and 357 male samples were collected. Respondents characteristics show that the sample was diverse, and key variables including age, education level, time to run micro-ebusiness, and products differ between female and male groups. According to the descriptive statistical results, in the female group, the average age is 29 years old. More than 60% have college or above education level. The average time to run micro-ebusiness is two years. It is interesting to find that, more than 80% female respondents have different social roles, besides doing micro-ebusiness, more than half females have employed work, or being full-time mother, or being college student. 80% of female respondents are engaged in women-targeted consumer goods sector, such as cosmetics, skin care products, clothing, fashion, luggage. In the male group, the average age is 30 years old. In the male group, the average age is 30 years old. More than 80% have college or above education level. The average time to run micro-ebusiness is slightly longer than female group, which is 27 months. 74% male respondents run full-time micro-ebusiness, acting fewer other social roles. More than 50% of male

respondents are engaged in women-targeted consumer goods, too, especially in cosmetics and clothes.

3.2 Deviation test

In this study, the Harman's single factor test^[21] was used to investigate the common method bias in the exploratory factor analysis. The results of the test show that the variance interpretation of the first factor in female group is 32.801%, in male group is 29.074%. It indicates that there is no serious common method bias in the measurement process of this study.

3.3 Variable measurement

To begin operationally defining the institutional environment profile for micro-ebusiness in China, we generated a large pool of items as potential measures. The

major reference sources include the research from Busenitz L. W., Carolina Gómez and Jennifer W. Spencer., as well as measurement from the Global Entrepreneurship Monitor (GEM). Based on the theory of institution, the questionnaire was developed to express the dimensions of institutional environment, as defined by 15 items in total shown in Table I. The intended measure includes 5 items in regulatory dimension, 4 items in normative dimension, and 4 items in cognitive dimension.

Considering a wide range of governmental institutions affect entrepreneurial performance in varied sectors and regions, this study elaborates the items in micro-ebusiness in online retailing industry of China. By pre-test with 200 samples of micro-ebusiness, the question for each item has been modified and improved according to the characteristics of micro-ebusiness. 5-point scale is used to ease the survey process of the respondents. Each item was evaluated by 5-point Likert scale, and the scoring method was from “totally disagree” to “completely agree”.

TABLE 1. MEASURE ITEMS OF INSTITUTIONAL ENVIRONMENT FOR MICRO-EBUSINESS

variables	Measurement item	Reference
Regulatory dimension	RE1: On the whole, government departments at all levels encourage and support individuals to start micro-ebusiness. RE2: The government has developed special policies and regulations to support small and micro entrepreneurs RE3: Government departments at all levels can give special and effective support to individuals who want to start a business. RE4: The government gave support to other organizations that support entrepreneurial activities. RE5: The government support entrepreneurs who had failed in entrepreneurship to restart	Busenitz et al., 2000 ^[9] GEM ¹
Normative dimension	NE1: In China, to start micro-ebusiness is a good career choice. NE2: In China, innovative thinking is encouraged factor leading to success. NE3: In China, micro-ebusiness entrepreneurs enjoy a higher social status NE4: In China, most people respect micro-ebusiness entrepreneurs. NE5: The public can see successful entrepreneurial cases in the mass media. NE6: The overall atmosphere of micro-ebusiness entrepreneurship in China is very good.	
Cognitive dimension	CE1: Entrepreneurs know how to legally start a business and protect their own achievement CE2: Entrepreneurs know how to identify various entrepreneurial risks CE3: Entrepreneurs know how to deal with various venture risks CE4: Entrepreneurs know how to find the market information they need	

4 EXPLORATORY FACTOR ANALYSIS

The current study used exploratory factor analysis (EFA) to test the dimensionality of institutional environment for female and male group. This approach is widely used to search for the smaller set of latent factors to represent the larger set of variables^[22]. It is also useful to define the underlying structure among the analyzed variables.

In the model of factor analysis, $X=(X_1, X_2, \dots, X_p)$ represents the observable random variable, the mean vector $E(X)=0$, the covariance $Cov(X)$ is equal to the correlation matrix. $F=(F_1, F_2, \dots, F_m)(m \leq p)$ represents

the unobservable vector, its mean $E(F)=0$, and the covariance $Cov(F)=1$, which means the components of the vector are independent. The random variable $e=(e_1, e_2, \dots, e_p)$ with a mean value of zero ($E(e)=0$) is independent from F . Furthermore, the covariance matrix of e is a diagonal matrix, that means its components e are independent of each other. The equation of the analysis factor model is introduced as follows:

$$\begin{cases} X_1 = a_{11}F_1 + a_{12}F_2 + \dots + a_{jm}F_m + e_1 \\ X_2 = a_{21}F_1 + a_{22}F_2 + \dots + a_{2m}F_m + e_2 \\ \vdots \\ X_p = a_{p1}F_1 + a_{p2}F_2 + \dots + a_{pm}F_m + e_p \end{cases}$$

In this study, our data proved suitable for EFA analysis

¹ Global Entrepreneurship Monitor (GEM) is a consortium of national country teams, primarily associated with top academic institutions, that carries out survey-based research on entrepreneurship around the world. The GEM model acknowledges that entrepreneurial activity shaped by a set of social, cultural, political and economic contextual factors in nine pillars which involved in GEM Entrepreneurial Framework conditions. Our study made reference mainly in its pillars of “government policy” and “social and cultural norms”.

by reliability and validity test as shown in Table II. Bartlett's test of sphericity tests the hypothesis that the correlation matrix is an identity matrix, which would indicate that variables are unrelated and therefore unsuitable for structure detection. The Kaiser-Meyer-Olkin Measure (KMO) of Sampling Adequacy is a statistic that indicates the proportion of variance in variables that might be caused by underlying factors. High values (close to 1.0) generally indicate that a factor analysis may be useful with the given data. This paper uses SPSS22.0 to test the reliability and validity of the data collected by the questionnaire. The results confirmed three interpretable and distinct componential factors extracted for each group. In the female group, the appropriateness of factor analysis is supported by Bartlett's test ($\chi^2=2658.022$, Sig.< 0.005) and the Kaiser-Meyer-Olkin measure of sampling adequacy (0.894). 13 out of 15 items have loadings of over 0.5, and two items ("NE1: In China, to start micro-business is a good career choice" and "NE4: In China,

most people respect micro-ebusiness entrepreneurs") have deleted. In the male group, the appropriateness of factor analysis is supported by Bartlett's test ($\chi^2=1137.925$, Sig.< 0.005) and the Kaiser-Meyer-Olkin measure of sampling adequacy (0.851). 11 out of 15 items have loadings of over 0.5, and four items ("RE1: On the whole, government departments at all levels encourage and support individuals to start micro-ebusiness", "NE1: In China, to start micro-ebusiness is a good career choice", "NE2: In China, innovative thinking is encouraged factor leading to success", and "NE6: The overall atmosphere of micro-ebusiness entrepreneurship in China is very good") have deleted.

The Cronbach's α coefficient is calculated as an important index representing the internal consistency reliability of each structure. In this study, the Cronbach's α coefficient of each structure is all above the value 0.6, which supported the reliability of the structure.

TABLE 2. RELIABILITY AND VALIDITY TEST OF VARIABLES FOR FEMALE GROUP

Female (N=689)				Male (N=357)			
Factor	Measure Items	Factor Load	Cronbach's α	Factor	Measure Items	Factor Load	Cronbach's α
Regulatory Environment (RE)	RE3	0.707	0.681	Regulatory Environment (RE)	RE2	0.621	0.665
	RE4	0.643			RE3	0.650	
	RE5	0.727			RE4	0.683	
	NE3	0.685			RE5	0.666	
Normative Environment (CE)	RE1	0.635	0.646	Normative Environment (NE)	NE3	0.632	0.668
	RE2	0.620			NE4	0.772	
	NE2	0.580			NE5	0.628	
	NE5	0.585		Cognitive Environment (CE)	CE1	0.600	
NE6	0.555	CE2	0.685				
Cognitive Environment (CE)	CE1	0.723	0.745	CE3	0.782	0.708	
	CE2	0.746		CE4	0.664		
	CE3	0.705					
	CE4	0.651					
KMO = 0.894, Bartlett's test of sphericity approximate chi-square=2658.022; df=105; significance=.000				KMO = 0.851, Bartlett's test of sphericity approximate chi-square=1137.925; df=105; significance=.000			

Note: Factor loadings of (0.50) and above are adopted.

5 DISCUSSION AND CONCLUSION

5.1 Discussion

The objective of this study was to investigate how regulatory, normative, and cognitive dimensions take form in a measure of institutional environment by EFA from gender perspective.

Firstly, for both men and women, the 4 items of cognitive dimension are retained and automatically extracted in one factor, which is consistent with the measurement indicators in previous studies (e.g. Busenitz

et al., 2000)^[9]. The first item is "CE1: Entrepreneurs know how to legally start a business and protect their own achievement", which reveals the extent to which the individuals are able to legally start micro-ebusiness and protect their own achievement. The second item is "CE2: Entrepreneurs know how to identify various entrepreneurial risks", which reveals the extent to which the individuals are able to identify different entrepreneurial risks and keep awareness of risk-taking. The rest two items are "CE3: Entrepreneurs know how to deal with various venture risks" and "CE4: Entrepreneurs know how to find the market information they need", which reveal to extent to which the individuals are able to deal with various venture risks and find the needed market

information for micro-ebusiness.

It is imperative that both male and female individuals have social knowledge to find entrepreneurial opportunities at the cognitive level. However, each item in cognitive dimension acts different role for females and males. In the female group, the factor loading of CE1, CE2, CE3, CE4 are 0.723, 0.746, 0.705 and 0.651 respectively, in which CE2 has the greatest impact on cognitive dimension. In the male group, the factor loading of CE1, CE2, CE3, CE4 are 0.600, 0.685, 0.782 and 0.664 respectively, in which CE3 has the greatest impact on cognitive dimension. That means, in the cognitive dimension of the institutional environment, the most important thing for women is how to identify entrepreneurial risks, while for men is how to deal with entrepreneurial risks.

Secondly, this study finds that, for male group, even if the measurement indicators are mixed together and reextracted using exploratory factor analysis, they still follow the original category and exactly fall into the three factors. However, for female group, the measurement indicators of regulative and normative items are mixed together and recombined into two new factors. NE3, RE3, RE4, and RE5 constitute a new regulatory factor. It shows that for women, enjoying a higher social status needs to be included in the scope of regulation with stronger executive power.

Meanwhile, RE1, RE2, NE2, NE5, NE6 constitute another new normative factor in female group, which is distinguished from the previous study. As Busenitz et al. (2000) stated that, the normative dimension includes "society's admiration for individuals who start their own businesses, the belief that innovative and creative thinking is good, and the belief that starting a business is an acceptable and respected career path". However, in our study, the final measurement has deleted NE1 (good career choice) for both men and women. For female group, NE4 (social respect) is deleted, too. This indicates that to start micro-ebusiness may be not yet a respectable career choice in China. As described in the data analysis, Chinese women faced more role conflicts and entrepreneurial difficulties. The reason why micro-entrepreneurship is not respected by society is that its income is not stable, and it is difficult to identify labor relations and lack of social security. Therefore, the government has to formulate more flexible policies to help reshape new social norms, which is of great significance to women's entrepreneurship.

In addition, in the normative dimension, innovative thinking (NE2) and good entrepreneurship atmosphere (NE6) have also been deleted from the male group. As to start micro-ebusiness is heavily dependent on e-commerce platforms, which control the business rules and limits the entrepreneur's ability to innovate independently.

5.2 Conclusion

To support women's micro-ebusiness entrepreneurship has been a significant research topic for employment creation and poverty alleviation worldwide. Based on exploratory factor analysis, this study found that, the early scholars' measurement of the institutional environment in regulatory,

normative, and cognitive dimensions still applies to Chinese males in the micro-ebusiness sector. However, the specific items regarding regulatory and normative have to be redesigned to females. From the evidence of China, this study synthesized the literature related to the institutional environment and contributed to reconsider its measurement from gender perspective. It provided a better understanding of how different the institutional environment was evaluated and functioned to female and male. While the survey sample, which included 689 females and 357 males in retail micro-ebusiness, is relatively large in comparison to previous studies, it is still limited given the overall number of all targeted population. Further study can include a broader sample in varied sectors and thus provide more generalizable findings.

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