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A STUDY ON THE IMPACT OF ENTREPRENEURIAL SPIRIT ON BUSINESS ETHICAL DECISION-MAKING - -BASED ON THE SAMPLING OF CHINA'S TOP 500 PRIVATE ENTERPRISES LIST

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Abstract

Based on a computational social science research paradigm, this research used a mixed-method design of a qualitative research plus a quantitative research, and this research put forward the hypothesis of the correlation between entrepreneurial spirit, business ethical decision-making and ethical awareness, and constructed a theoretical model of 500 entrepreneurs from Top 500 Chinese Private Enterprises (2021) as the sample. Secondary data such as video, audio and text of speeches, interviews delivered in public by sampled entrepreneurs between January 1, 2019 and December 31, 2021 were used as the data source to test the theory with computer-aided text analysis (CATA) method with natural language processing (NLP), binary logistic regression, parallel mediation test and likelihood chi-square ratio test. From the conclusion, it can be seen that entrepreneurial spirit has differential influence on business ethical decision-making under different decision-making mechanisms, and entrepreneurial spirit can improve business ethical decision-making. At the same time, ethical awareness plays a masking effect in the process of influencing entrepreneurial spirit on business ethical decision-making, which provides methodological references for explaining the current social phenomena and ethical decision-making in business management.

Key words: Entrepreneurial spirit; Business ethical decision-making; Content analysis; natural language processing; Computer-aided text analysis

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1. Introduction

As time changes, with the economic development, the economic and ethical issues faced by enterprises are becoming increasingly complex. The emergence of business ethical problems such as ecological and environmental pollution and food safety has directly led to the crisis of their business ethics, public trust and even push the enterprises to the point of life or death in their business management, and the problems exposed are directly or indirectly correlated to their business ethical decisions (Reynolds, 2006). Business ethical decision-making is increasingly important to the construction of the organizational justice atmosphere, enterprise social responsibility and sustainable development of enterprises (O'Fallon and Butterfield, 2005). Entrepreneur is the fourth factor of production that combines land, labor and capital (Say, 1803) and is the core and soul of an enterprise (Cai, 2018). The profoundness of an entrepreneur's awareness of business ethics directly influence an enterprise's understanding and implementation of its ethical and social responsibility policies. Entrepreneurial spirit controls an entrepreneur's various entrepreneurial behaviors. Many studies have proved that entrepreneurial spirit plays a significant role in promoting economic growth and making economic benefits for enterprises. Whether and how entrepreneurial spirit plays a role in the ethical decision-making process and

performing social responsibilities has become a topic worth discussion in recent years. This research took the study of individual entrepreneurial spirit and the factors influencing business ethical decision-making at the individual level as a cut-in point. With the support of computational social science research paradigm, this research used a mixed research methods to analyze and empirically test the influence of entrepreneurial spirit on business ethical decision-making.

2. Conceptual foundations and hypotheses

2.1. Entrepreneurial Spirit

Cantillon (1755), a French classical traditionalist who first systematically studied entrepreneurial spirit in economics, focused on the function of entrepreneurs rather than their personalities. In the 200-year history development of western economics, researches on entrepreneurial spirit have gradually evolved into the three schools of German school, Chicago School and Austrian School. Chicago School attaches importance to the entrepreneur's adventure spirit and risk-taking spirit. German school emphasizes the innovation of entrepreneurs. Austrian school emphasizes entrepreneurs' recognition of market opportunities. This research summarized the mainstream definitions of entrepreneurial spirit in T2.1.

T2.1 Summary of mainstream definitions of entrepreneurial spirit

Scholar	Year	Definitions of entrepreneurial spirit	Label
Knight	1921	Entrepreneurial spirit is a kind of creative spirit and the spirit of taking risks that can open up the way with the most creative activities under the condition of unreliability.	Spirit
Schumpeter	1934	Entrepreneurial spirit is a combination of doing something that no one else has done, or doing it in a way that no one else has done. It's a spirit of constant innovation.	Spirit
Schults	1975	Entrepreneurial spirit is the ability to deal with disequilibrium.	Ability
Mises	1949	Entrepreneurial spirit is the act of enduring uncertainty, which can be identified by profit or loss.	Ability
Kirzner	1978	Entrepreneurial spirit is the ability to seize new opportunities first, recognize them and seize them to bring the market back into balance.	Ability
Drucker	1985	Entrepreneurial spirit is a kind of innovation behavior and a social innovation behavior, and it has the leverage effect of social progress.	Ability
Jie Xin	2004	The entrepreneurial spirit of the new era should adapt to the requirements of the time, including the courage to take risks, the courage to innovate, the attitude toward active competition, the spirit of cooperation and the spirit of salvation.	Spirit
Weiying Zhang	2004	Entrepreneurial spirit is the spirit of adventure, innovation, discontent and heroism.	Spirit
Yiqun Xing	1993	The entrepreneurial spirit is formed in the special environment of the enterprise management, which reflects the unique ideology, mode of thinking and psychological state of the entrepreneur.	Ability and Diathesis
Liangding Jia, Sanduo Zhou	2006	Entrepreneurial spirit consists of three aspects: knowledge accomplishment, innovation ability and ethical quality.	Ability and Diathesis
Weimin Zhou	2019	Entrepreneurial spirit is essentially a kind of behavior in which people compete to become entrepreneurs.	Ability

Source: Scholar Summary

The definition of the connotation of entrepreneurial spirit by Chinese and western scholars are mainly based on two perspectives: the axiology theory, which emphasizes the characteristics of an entrepreneur's personality, and behavior theory, which emphasizes the characteristics of an entrepreneur's behavior. Researches on the connotation of entrepreneurial spirit based on axiology theory focuses on "What is an entrepreneur" and "What spiritual temperament should an entrepreneur hold". Researches on the connotation of entrepreneurial spirit based on the behavioral theory holds "What does an entrepreneur do" as the essence of entrepreneurship. Cai et al. (2009) proved by empirical evidence that entrepreneurial spirit includes five dimensions: innovation, learning, cooperation, dedication and responsibility. According to Xin (2004), entrepreneurial spirit in the new era should meet the requirements with the development of time. It contains not only the attitude towards risk taking, innovation and active competition, but also the consciousness of cooperation and salvation spirit.

2.2. Business ethical decision-making

The concept of "business ethical decision-making" came into being in the background of frequent non-ethical incidents such as business fraud and bribery in western countries in 1970s. Since then, management in enterprises begin to pay attention to the behavior of organizations and individuals in ethical problems and in the ethical decision-making process, as well as the coordination and conformity of economic and social benefits, profit pursuit and ethical compliance. Trevino and Nelson (1999) believed that the ethical decision-making

process is the personal ethical decision-making process of management. Bird and Gandz (1991) believed that not all decisions in enterprises are correlated to ethics. Ethical decisions address the part of enterprise decision-making process involving value judgment (Wu & Liu, 2006). According to Skopos approach of business ethics theory, Wang et al. (2018) divided enterprise ethical decision-making into utilitarian decision-making and egoistic decision-making.

2.3. Correlation between entrepreneurial spirit and business ethical decision-making

In recent years, researches on the influencing factors of business ethical decision-making focus on three aspects: individual factors, organizational factors and moral intensity. In view of the fact that the subject and object of business ethical decision-making are both human beings, decision makers must pay attention to the spiritual factors of human beings while paying attention to various material factors, which inevitably involves the moral ideals, ideological state, spiritual temperament and other categories reflecting human ethics. Researchers have identified that enterprises whose founders make ethical decisions guided by clear values tend to be sustainable and have a strong enterprise culture (Joyner et al., 2002). As a kind of value and spiritual guidance, entrepreneurial spirit has an influence on an enterprise's ethical decision-making process. Therefore, this research made a hypothesis as follows.

H1: Entrepreneurial spirit has a positive influence on business ethical decision-making.

Different moral, philosophical and theoretical bases dominate different ethical theoretical systems. According to Skopos approach of business ethics theory, Wang et al. (2018) divided business ethical decision-making into utilitarian decision-making and egoistic decision-making. Utilitarian decision-making refers that an enterprise will give priority to the interests of the public when making its own decisions. In other words, it will strive to improve social welfare while making profits. The enterprise will not only respond to the profit-making demands of shareholders and other stakeholders, but also respond to the social expectations of the public in a timely manner. Egoistic decision-making refers that the decision-making of enterprises is limited to the pursuit of profit maximization. Joyner et al. (2002) found through research that enterprises whose founders make ethical decisions under the guidance of clear values tend to be sustainable. Liu (2020) believed

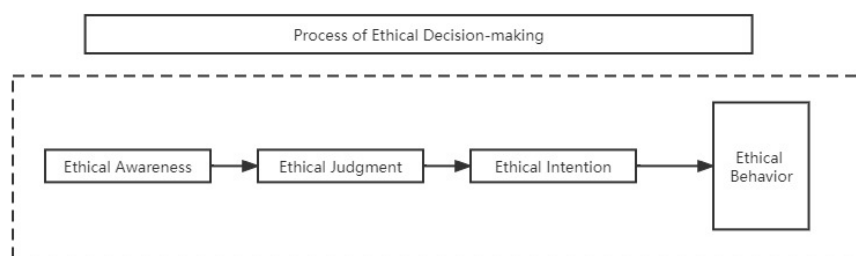
that the entrepreneurial spirit of modern entrepreneurs influence the development of ethical decisions and behaviors of enterprises to a certain extent. Based on the definition of the classification of business ethical decision-making in this research, the following hypotheses were made.

H2: Entrepreneurial spirit has a positive influence on utilitarian ethical decision-making.

H3: Entrepreneurial spirit has positive influence on egoistic ethical decision-making.

2.4. Ethical awareness

According to Rest (1986), the four stages of ethical decision-making are ethical awareness, ethical judgment, ethical intention and ethical behavior (as shown in Figure F2.1 below).



F2.1 Business Ethical Decision-making Process Model

According to Wu and Liu (2006), "ethical awareness" is the key to initiating ethical decision-making. Empirical studies show that ethical awareness is the first step and the key factor in ethical decision-making process model, which can influence ethical judgment and ethical intention. Kang and Qian (2018) believed that "ethical awareness", as a component of ethical decision-making process, is also influenced

by personal factors (such as personality, education, culture, religion, gender, values), organizational factors (such as organizational culture, policy procedures, ethical norms) and the moral intensity of events. In summary, in combination with the research questions, this research made the following hypotheses.

H4: Entrepreneurial spirit has a positive influence on ethical awareness

H5: Ethical awareness plays a mediating role in the influence of entrepreneurial spirit on business ethical decision-making

Craft (2013) found that in researches on ethical awareness, people use different operational definitions, such as "ethical sensitivity" and "ethical perception". Darcia and Narvaez (1996) and Zheng and Cen (2007) argued that according to the psychological process of ethical sensitivity, ethical sensitivity is divided into two sequential components of ethical perception and ethical interpretation. Ethical perception involves the feeling of "whether there is an ethical problem", while ethical interpretation mainly involves the understanding of "what is" and "how is" an ethical problem. Combined with the research purpose and category, this research measured ethical sensitivity through two dimensions of ethical perception and ethical interpretation. The following sub-hypotheses were proposed.

H4a: Entrepreneurial spirit has a positive influence on ethical perception.

H4b: Entrepreneurship has a positive influence on ethical interpretation.

H5a: Entrepreneurial spirit has a positive influence on business ethical decision-

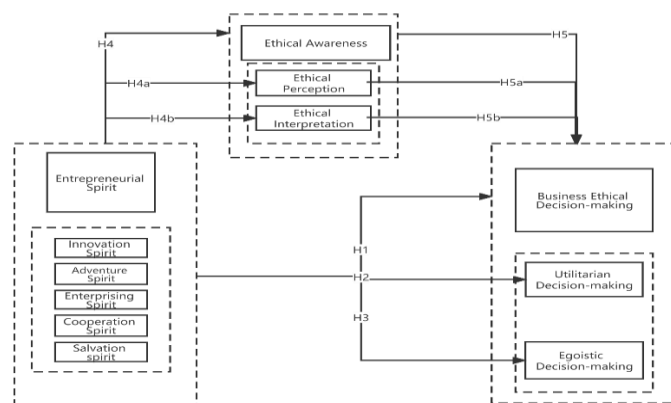
making through ethical perception.

H5b: Entrepreneurial spirit has a positive influence on business ethical decision-making through ethical interpretation.

3. Methodology

3.1. Theoretical framework

Under the support of computational social science research paradigm, this research used a mixed research method, a content analysis method and natural language processing to process qualitative data quantitatively as the basic data for research hypotheses and model testing. In terms of quantitative analysis, on the premise of verifying the reliability of the data, this research used a descriptive analysis, a logistic regression analysis, a parallel mediation effect test and other methods. Based on the structured data after coding, a mathematical model was constructed to test the hypotheses. Based on such basic theories as the entrepreneur theory, entrepreneurial spirit theory, enterprise social responsibility theory, stakeholder theory, attitudinal behavior theory and utilitarianism theory, this research constructed and tested the theoretical model around the research idea of "entrepreneurial spirit-ethical awareness-business ethical decision-making" (F3.1).



F3.3 Theoretical model

3.2. Variable design

In order to facilitate the operability in the research, on the basis of literature review, this research defined entrepreneurial spirit in an operational way and applied it to the empirical process of this research. For details, see Table 3.1.

T3.1 Research variables and operational definitions

Category	Name	Symbol	Variable Artifacts	Code	Assignment
Independent Variables	Entrepreneurial Spirit	X	Innovation Spirit	CXJS	$X=(CXJS+MXJS+JQJS+HZJS+JSJS)/5$
			Adventure Spirit	MXJS	Compare the discourse texts in the entrepreneur corpus:
			Enterprising Spirit	JQJS	1=There is a case that matches the measurement semantics
			Cooperative Spirit	HZJS	0=There is no case that matches the measurement semantics
			Salvation Spirit	JSJS	After the value is assigned, the average value is taken, and the average value is used as a specific value to measure.
Dependent Variables	Business Ethical Decision-making	Y	Utilitarian Decision-making	GLXJC	Starting from the definition of ethical decision-making, the ethical decision-making defined in this research are dichotomous variables, including utilitarian decision-making (GLXJC) and egoistic decision-making (LJXJC).0=GLXJC,1=LJXJC
			Egoistic Decision-making	LJXJC	$RZ=(LLJC+LLJS)/2$
			Ethical Perception	LLJC	Compare the discourse texts in the entrepreneur corpus:
Mediating Variable	Ethical Awareness	RZ	Ethical Interpretation	LLJS	1= There is a case that matches the measurement semantics
					0= There is no case that matches the measurement semantics
Control Variables	Gender Age Education Background			XB	Male=0,Female=1
				NL	0-35=0,Above 35=1
				XL	Bachelor degree or below = 0 Above bachelor degree = 1

3.3 Sample selection and data source

3.3.1 Sample Selection

This research took Chinese private entrepreneurs as a group for cluster sampling, selected 500 private enterprises from "*Top 500 Private Enterprises in China (2021)*", and took 500 founders or then-chairmen (whose tenure ended on December 31, 2021) as the subjects of the sample (see Appendix 1 for details) for information. It met the minimum sample size requirements with a sampling error of 5% and a confidence level of 95% under the premise of large sample size.

3.3.2 Data source

The data of this research were derived from the speeches, interviews and other text and video materials made by the sample entrepreneurs in public from January 1, 2019 to December 31, 2021. The data mining channels come from a total of 13 portal website servers of 11 government-owned portal websites and 2 commercial portal websites that have the most communication influence in China, including people.cn, www.Xinhuanet.com and www.cctv.com. In order to further ensure the compliance, authenticity, reliability and validity of the data, this research, on the premise of embedding the ethics of crawler and after cross-network comparison and video and text verification, kicked out the incomplete, false,

redundant and invalid data of non-entrepreneurial behaviors. A total of 30,139 news reports of 390 entrepreneurs were collected as the original materials for the establishment of the entrepreneur corpus.

4. Data analysis

4.1. Content analysis

The analysis unit of this research was individual entrepreneur, and the words, word pairs and sentences in the discourse text of individual entrepreneurs were taken as the data analysis unit. On the basis of literature review, this research drew on the relevant research results of entrepreneurial spirit, business ethical decision-making and ethical awareness, used deductive method to construct a research category system, designed coding table and carried out a computer-aided text analysis.

4.1.1 Construction of the categories of entrepreneurial spirit

Based on the relevant research scales of Covin and Slevin (1991), Cai et al. (2009), Ding (2010) and Xin (2014), this research constructed the primary category and secondary category of entrepreneurial spirit from the five dimensions of entrepreneurs' innovation spirit, adventure spirit, enterprising spirit, cooperative spirit and salvation spirit (as shown in T4.1 below)

T4.1 Category of entrepreneurial spirit

Primary Category	Secondary Category	Dimension
Entrepreneurial Spirit	Innovation Spirit	Strong market sensitivity and development ability Emphasis on research and development capabilities and technological changes Greater investment in research and development Actively choosing projects with high risks and high returns Be the pioneer to enter a new field compared to other competitors
	Adventure Spirit	Always staying a bold and positive in order to increase the likelihood of potential opportunities They tend to be a bold and positive when facing uncertain decisions Not satisfied with the current situation of the enterprise (convinced that there will be better development) Continuously capturing business opportunities and expand business scope
	Enterprising Spirit	Identifying the latest market opportunities and business opportunities for industry development in a timely manner Continuous efforts to operate, be confident to make the enterprise bigger and stronger Always be proactive and go ahead of competitors Allowing employees become shareholders and treat employees as companions
	Cooperative Spirit	Actively creating a united organizational atmosphere, with strong affinity and cohesion Communicating with employees at all levels Focus on teamwork rather than individualism More inclined to cooperate with other people or organizations and believing there is cooperation in competition Giving back to society voluntarily and regularly Respecting social culture and customs
	Salvation Spirit	Leading the enterprise through a large number of practical actions to care about the public and help disadvantaged groups Treating the enterprise management not only as an individual matter, but also with practical actions to have a positive influence on the society

Source: Covin and Slevin (1991), Zhang (2004), Cai et al. (2009), Ding (2010) and Xin (2014), et al.

4.1.2. Construction of business ethical decision-making category

In this research, based on scholars' definition and measurement basis for business ethical decision making, five categories developed by Wilson (1980) in a study and the

classification of business ethical decision making under different decision-making mechanisms are used to construct the primary and secondary categories of business ethical decision making, as shown in T4.2 below.

T4.2 Primary and secondary categories of business ethical decision making

Primary Category	Secondary Category	Dimensionality
Business Ethical Decision-making	Utilitarian Ethical Decision-making	The starting point of making decisions is customer-centered.
		The starting point for making decisions is employee-centered.
		The starting point for making decisions is society-centered.
		The starting point for making decisions is ethics-centered.
	Egoistic Ethical Decision-making	The starting point of making decisions is to maximize the profits of the enterprise.

Source: Reidenbach & Robin (1990), Wilson (1980), Fritzsche (2007), Xu et al. (2014), Wang et al. (2018), et al.

4.1.2. Construction of ethical awareness categories

In this research, starting from the definition of ethical sensitivity, the corpus is constructed into categories from ethical perception and ethical interpretation, as shown in Table 4.3.

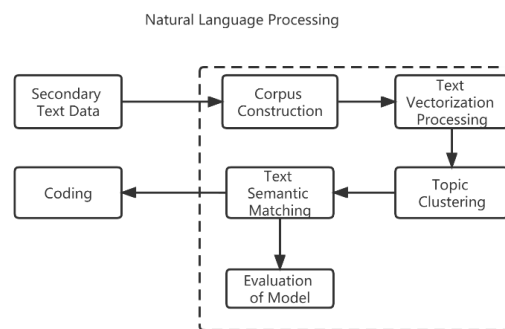
T4.3 Category of ethical awareness

Primary Category	Secondary Category	Definition
Ethical Sensitivity	Ethical Perception	Recognizing that dealing with an ethical problem
	Ethical Interpretation	Analysis and judgment of ethical issues based on values

Source: Hanhimaki and Tirri (2009)

4.2. Natural Language Processing (NLP)

After the initial construction of the database of quotations from interviews with entrepreneurs, it is necessary to further construct the entrepreneur corpus, identify and classify the entrepreneurial spirit, business ethical decision-making and ethical awareness reflected in the entrepreneur discourse. In this research, natural language processing was used. By using python language, transformer model and algorithm [21], text data was processed structurally from the four aspects of corpus construction, text vectorization processing, topic clustering and text semantic matching. Details are shown in Figure F4.1 below.



F4.1 Natural Language Processing

Combined with the category system constructed above, the method of cosine similarity measurement was used in this research to calculate the similarity between texts for semantic matching, and the result is shown as below (T4.4).

T4.4 List of semantic matching statistics

Number	Category	Number of Original Statements	Number of Valid Statements
1	Entrepreneurial Spirit	23300	8177
2	Business Ethical Decision-making	23300	8117
3	Ethical Awareness	23300	95

4.3. Computer aided text analysis

In this research, **computer aided text analysis** (CATA) was used together with **NLP** to automatically create an emerging encoding result based on the text content. Based on the further refinement of the category construction, combined with the subject clustering of the corpus, coding table 1 (see attachment 1) for the content analysis in this research was made.

4.3.1. Coding and data conversion

In order to process unstructured text data in a structured way, combined with the

hypotheses and theoretical models of the research, this research used the measurement level of "dichotomous" (Cicchetti, 2006) and took "existence or non-existence" as the criterion to conduct a quantitative processing of the above text data. On the basis of coding table 1 above, this research used the method of logical assignment and combined the results of text classification and topic clustering to assign values to the 390-sampled entrepreneur sorted out and made coding table 2 (see attachment 2) of the structured data.

4.4. Reliability and validity analysis

The coding tables in this research were based on the category of current maturity scales used by Chinese and western scholars and coded by CATA. This research conducted a reliability test and a validity test on the category items of the coding tables, and the results demonstrated that the reliability coefficient of the entrepreneurial spirit was

0.945 (T4.5), indicating that the reliability quality of the research data was high, and the reliability coefficient of the enterprise ethical decision data was 0.707 (T4.6), which was within an acceptable reliability range. The results of validity test were that the KMO values of entrepreneurial spirit and business ethics decision-making were 0.901(T4.7) and 0.759(T4.8) respectively, indicating the coding process was of a good validity.

T4.5 Reliability analysis of entrepreneurial spirit coding data

Cronbach Reliability Analysis-X Variable			
Name	Total correlation of correction terms(CITC)	Coefficient of the item deleted	Cronbach α coefficient
JSJS	0.799	0.938	0.945
HZJS	0.768	0.942	
JQJS	0.879	0.928	
MXJS	0.842	0.933	
CXJS	0.759	0.947	
X	1	0.917	
Cronbach α coefficient: 0.949□			

T4.6 Reliability analysis of business ethical decision-making coding data

Cronbach Reliability Analysis-Y variable			
Name	Total correlation of correction terms(CITC)	Coefficient of the item deleted	Cronbach α coefficient
KH	0.477	0.656	0.707
YG	0.433	0.671	
SH	0.419	0.675	
DD	0.436	0.67	
LR	0.478	0.659	
Y	0.427	0.673	
Cronbach α coefficient: 0.717□			

T4.7 Validity analysis of entrepreneurial spirit coding data

Results of the validity analysis-X Variable		
Name	Factor load Factor1	Degree of commonality (common factor variance)
CXJS	0.831	0.69
MXJS	0.896	0.802
JQJS	0.919	0.845
HZJS	0.842	0.709
JSJS	0.866	0.75
X	1	0.999
Characteristic root value (before rotation)	4.794	-
Variance interpretation rate %(before rotation))	79.908%	-
Cumulative variance explanation rate %(before rotation)	79.908%	-
Characteristic root value (after rotation)	4.794	-
Variance interpretation rate %(after rotation)	79.908%	-
Cumulative variance interpretation rate %(after rotation)	79.908%	-
KMO	0.901	-
Barthes Spherical Number	13023.50	-
df	5	-
df	15	-
P values	0.000	-

T4.8 Validity analysis of business ethical decision-making coding data

Results of the validity analysis-Y Variable		
Name	Factor Load Factor1	Common degree (common factor variance)
KH	0.724	0.525
YG	0.714	0.51
SH	0.699	0.488
DD	0.597	0.356
LR	0.539	0.291
Characteristic root value (before rotation)	2.17	-
Variance interpretation rate %(before rotation))	43.391%	-
Cumulative variance explanation rate %(before rotation)	43.391%	-
Characteristic root value (after rotation)	2.17	-

After rotation) η^2	43.391%	-
%(after rotation)	43.391%	-
KMO η^2	0.759	-
Barthes Spherical Number η^2	214.798	-
df η^2	10	-
P values η^2	0.000	-

5. Discussion

5.1. Descriptive analysis

Table 5.1 below is the summary of the descriptive statistics of each variable. By checking the specific values, it can be seen that the founders or chairmen of the top 500 private enterprises in China generally have entrepreneurial spirit, and the level of ethical

decision-making made by entrepreneurs in sampled enterprises is relatively consistent. As for the control variables, it can be seen from the result that there is little difference in the educational background and age of the sampled entrepreneurs, that most of them are over 35 years old and that most of them have a bachelor's degree or above. In terms of age NL, almost all of them are over 35.

T5-1 Descriptive statistics of the main variables

Name	Mean \pm standard deviation	variance η^2	median η^2	Standard error η^2	Average of 95% CI(LL) η^2	Average of 95% CI(UL) η^2	IQR η^2	Kurtosis η^2	Partial degrees η^2	Coefficient of variation (CV) η^2
X	0.366 \pm 0.316	0.100	0.320	0.017	0.332	0.400	0.553	-1.013	0.495	86.349%
CXJS	0.518 \pm 0.419	0.175	0.667	0.023	0.473	0.563	1.000	-1.643	-0.060	80.944%
MXJS	0.312 \pm 0.345	0.119	0.250	0.019	0.275	0.349	0.500	-0.747	0.741	110.693%
JQJS	0.427 \pm 0.367	0.135	0.400	0.020	0.388	0.466	0.800	-1.417	0.214	85.981%
HZJS	0.264 \pm 0.315	0.099	0.200	0.017	0.230	0.297	0.400	-0.192	1.003	119.375%
JSJS	0.311 \pm 0.371	0.137	0.000	0.020	0.271	0.351	0.750	-1.021	0.720	119.214%
Y	0.147 \pm 0.355	0.126	0.000	0.019	0.109	0.185	0.000	2.017	2.001	241.109%
XB	0.021 \pm 0.144	0.021	0.000	0.008	0.006	0.036	0.000	43.258	6.708	683.460%
NL	0.985 \pm 0.122	0.015	1.000	0.007	0.972	0.998	0.000	62.569	-8.012	12.365%
XL	0.955 \pm 0.208	0.043	1.000	0.011	0.933	0.977	0.000	17.527	-4.407	21.751%

5.2. Regression analysis

5.2.1. Main effect test for direct effects

In the research on the direct influence of entrepreneurial on business ethical decision-

making, entrepreneurial spirit was used as a quantitative explanatory variable of gender, education background and age of an entrepreneur, a binary logistic regression

analysis was conducted respectively, and the mathematical model constructed is as follows.

$$\ln\left(\frac{p}{1-p}\right) = \theta_0 + \theta_1 X + \theta_2 XB + \theta_3 NL + \theta_4 XL$$

Model 1 :

The logistic regression test results are shown in Table T5.2 below.

T5.2 Logistic regression analysis of the influence of entrepreneurial spirit on ethical decision-making

Project	Regression coefficient	Standard Error	Wald	P	OR	OR values with a 95% confidence interval	
						Upper limit	Lower limit
constant	-24.716	158219.637	0	1.000	0	0	
X	-7.703	1.44	28.616	0.000***	0	0	0.008
NL	23.535	158219.637	0	1.000	16640590358.551	0	
XL	0.891	1.117	0.635	0.425	2.437	0.273	21.772
XB	0.404	1.286	0.099	0.754	1.497	0.12	18.626

dependent variable: Y

Note: ***, ** and * represent the significance levels of 1%, 5% and 10% respectively

As shown in the table above, entrepreneurial spirit does have a significant influence on business ethics decision-making, so hypothesis 1 is supported. It can be also identified that the higher the entrepreneurial spirit is, the higher the number of entrepreneurs who tend to make utilitarian ethical decisions rather than egoistic ethical decisions, so hypothesis 2 is supported. Relatively, hypothesis 3 is not supported. In terms of control variables, the age, education background and gender of an entrepreneur

does not have a respective significant effect on the business ethical decision-making from the result.

5.2.2. Likelihood chi-square test

In order to test the regression effect of the functional model, the likelihood chi-square ratio method was used in this research to test and evaluate the regression effectiveness of the model. The results are shown in Table T5.3 and T5.4 below.

T5.4 Model 1 evaluation test

Module Serial	Likelihood Ratio	Chi Square Values	P	AIC	BIC
Model 1	203.284		0.000***	213.284	232.324

T5.5 Classification evaluation test result of Model 1

Module Serial	Precision	Recall	Accuracy rate	F1	AUC
Model 1	0.856	0.856	0.877	0.792	0.852

5.2.3. Mediating effect test

A mediating effect model was used to test ethical awareness. Entrepreneurial spirit was taken as the independent variable, ethical awareness the mediating variable, business

ethical decision-making the dependent variable, and age, gender and educational background of an entrepreneur as control variables respectively. Combined with Model 2-Model 4 (T5.5), the following results were obtained after analysis (T5.6).

T5.6 Mediating effect model

Serial Number	Mathematical Model
Model 2	$Y = cX + e_1$
Model 3	$RZ = aX + e_2$
Model 4	$Y = c'X + bX_n + e_3$

The regression model of the influence correlation between entrepreneurial spirit and business ethical decision-making is as follows (T5.7).

T5.7 Summary of results of mediation effect test result of ethical awareness

Item	c gross effect	a	b	The a * b mediation effect value	a*b (Boot SE)	a*b (z price)	a*b(P price)	a*b (95%BootCI)	c' direct effect	inspect the conclusion
Ethical Awareness	-0.435	0.387	0.085	0.033	0.017	1.977	0.049**	0.073 - 0.006	-0.468	masking effect
Ethical perception	-0.435	0.447	0.064	0.029	0.016	1.846	0.066*	0.066 - 0.004	-0.464	masking effect
Ethical Interpretation	-0.435	0.327	0.049	0.016	0.012	1.368	0.172	0.046 - -0.0	-0.451	The mediation effect was not significant

Entrepreneurial spirit can play an influence on ethical awareness, ethical perception and ethical interpretation. Hypothesis 4, hypothesis 4a and hypothesis 4b are supported. At the same time, ethical awareness and ethical perception play a masking effect on the influence of entrepreneurial spirit on business ethical decision-making, that is, when entrepreneurial spirit and business ethical decision-making do not play an influence, ethical awareness and ethical perceive need to intervene to improve the effect, which is a mediating effect in a broad sense. Therefore, Hypothesis 5 and hypothesis 5a are supported. However, the mediating effect of ethical interpretation on the influence of entrepreneurial spirit on business ethical decision-making is not significant, so hypothesis 5b is not supported. This demonstrates that the understanding of ethical issues cannot directly influence the influence of entrepreneurial spirit on business ethical decision-making.

6. Conclusion and prospects

6.1. Conclusion

Centered on the idea of "entrepreneurial spirit-ethical awareness-business ethical decision-making", this research comprehensively analyzed the influence of entrepreneurial spirit on business ethical decision-making under different decision-making mechanisms, and further examined the mediating role of ethical awareness, and drew the following conclusions. Firstly, entrepreneurial spirit can play different influence on business ethical decisions under different decision-making mechanisms. In this research, entrepreneurial spirit plays a positive role in business ethical decision-making. The more complete the entrepreneurial structure of entrepreneurs is,

the higher the entrepreneurial spirit is, and the more inclined entrepreneurs are to make utilitarian ethical decisions from the perspective of customer-centered, employee-centered, society-centered and ethics-centered. Entrepreneurial spirit is helpful to make both economic and social benefits in business ethical decision-making. Therefore, entrepreneurs should give full play to the role of entrepreneurial spirit in the process of business ethical decision-making. Secondly, ethical awareness plays a masking effect on the influence of entrepreneurial spirit on business ethical decision-making. In the process of making ethical decisions, entrepreneurs can effectively influence ethical awareness by giving play to their entrepreneurial spirit, and effectively combine the value systems of innovation, adventure, enterprising, cooperative and salvation spirit in entrepreneurial spirit with ethical awareness. However, when entrepreneurial spirit fails to have an influence on business ethical decision-making, solutions can be found from the perspective of entrepreneurs' ethical awareness. Therefore, when entrepreneurial spirit fails to play a positive role in enterprise ethical decision-making, government departments and social groups should form a joint force by appeal to the media of public opinion, and enhance the role of entrepreneurial spirit in business ethical decision-making by improving the intensity of social morality and the ethical awareness of entrepreneur.

6.2. Prospect

Firstly, through the analysis of panel data formed by speeches, interview videos and text data of 500 Chinese entrepreneurs published in public in the past three years, this research preliminary verified the

influence of entrepreneurship on business ethical decision-making and drew a general conclusion. The correlation between entrepreneurial spirit and business ethical decision-making in oriental culture offers reference. In future studies, it could be possible to further conduct cross-cultural, cross-temporal dynamic analysis and heterogeneity researches. Secondly, presently, the protection, inheritance and stimulation of entrepreneurial spirit has become the general consensus of the government and people from all walks of life, and has been interpreted as the focus of improving the key issues in the ethical decision-making process in an enterprise. In the future, the five components of entrepreneurial spirit could be further refined and combined with the actual enterprise management to further study the differences of the influences of the innovation spirit, adventure spirit, cooperative spirit and salvation spirit on business ethical decision-making, so as to offer reference for ethical decision-making of enterprise management.

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