Entrepreneurial Team Heterogeneity and Decision-Making Quality: The Roles of Opportunity Novelty and Team Reflexivity

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Abstract. Based on social identity theory and upper echelons theory, the paper aims to explore the relationship between entrepreneurial team heterogeneity and decision-making quality moderated by opportunity novelty and team reflexivity. Moderated multiple regression models were opted for empirical studies, using data gathered from 71 entrepreneurial teams and 234 individual members in China. Both the social and functional heterogeneity of entrepreneurial teams directly affect the quality of decision-making. Team reflexivity significantly weakens the negative effects of social heterogeneity on decision-making quality, while opportunity novelty moderates in varying manners.

Keywords: Entrepreneurial team heterogeneity, Entrepreneurial decision-making quality, Opportunity novelty, Team reflexivity

1 Introduction

The success of ventures lies in the correct decisions made at crucial moments. Scholars of entrepreneurial cognition note that enterprises grow differently because of the discrepant accumulation of decision-making methods and processes. According to upper echelons theory, team heterogeneity is a crucial characteristic in depicting team composition, whose features are suggested to predict decision-making outcomes [1]. However, prior studies have laid little attention on entrepreneurial decision-making as an overarching variable and research with startups as objects.

In addition to the complexity of team heterogeneity, contextual factors influence the process. One is these is team reflexivity. A team with a high level of reflexivity tends to be more tolerant of members' differences [2], which makes it easier to enhance members' trust in communication and have a constructive discussion. The other is opportunity novelty. The novelty of an opportunity differs, making each entrepreneurial opportunity unique, which originates from the differences in realizing the potential value of the goal method framework. However, existing research lacks the consideration of these contextual factors.

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Therefore, based on the upper echelons theory, social identity theory, and social cognition theory, we conducted research with entrepreneurial teams as research objects to discuss the effect of entrepreneurial team heterogeneity on decision-making quality with varying levels of reflexivity and opportunity novelty.

2 Theory and hypothesis

2.1 Entrepreneurial Team Heterogeneity

Team heterogeneity is the difference between team members regarding demographic attributes and critical cognitive thinking, values, and experiences [3]. We divide entrepreneurial team heterogeneity into social and functional categories in this study. Social heterogeneity refers to the differences in entrepreneurial team members' social status and social roles, while functional heterogeneity refers to differences in team members' job-related knowledge, skills, and experience.

2.2 Entrepreneurial Team Heterogeneity and Decision-Making Quality

Having diversified perspectives and effective discussions among team members takes advantage of an enriched knowledge base and professional skills to the largest extent, which is essential for ensuring the collective nature of team decision-making. Therefore, we predict that entrepreneurial team heterogeneity, specifically social and functional heterogeneity, significantly affects the quality of decision-making.

Entrepreneurial team social heterogeneity is shown by differences among team members in terms of age, educational attainment, and major. With respect to upper echelons theory, individual psychology changes with age. Elderly TMT members who tend to be more steady but less determined may be conflicting with younger TMT members who are willing to suffer higher risks for the realization of goals. The contrasting perspectives would restrict the exertion of collective wisdom. Members with significant differences in major have varying languages, paradigms, and even goals [4]. Opinions without effective integration may further lead to inefficient integration of information, resulting in poor decision-making outcomes.

From the perspective of the social identity theory, social heterogeneity induces social categorization. In heterogeneous teams, communication frequency, openness, and ease of opinions may be decreased, resulting in lower quality of decision-making because internal information retrieval and sharing are hindered.

H1a: Entrepreneurial team social heterogeneity is negatively related to decision-making quality.

Functional heterogeneity includes heterogeneity in industry and functional experience. The upper echelons theory notes that an individual's previous professional experience determines his or her perspective on current strategic opportunities. A high level of industry experience heterogeneity helps to make a systematic evaluation of the industry situation and builds diverse network resources and extensive information channels, which leads to more feasible decision-making. A higher level of functional experience heterogeneity generally indicates that team members have a wealth of skills

and expertise. It diversifies analyzing perspectives, enriches levels of description, and a more integrated decision is more likely to be made.

Considerable work-related heterogeneity increases the width of the perspectives, enriches cognitive resources, and enhances the overall problem-solving ability. Decision-making becomes more integrated and accurate, thus improving decision-making quality.

H1b: The functional heterogeneity of an entrepreneurial team is positively related to decision-making quality.

2.3 Moderating Effect of Entrepreneurial Team Reflexivity

Team reflexivity is a team resource that encompasses the capability and tendency of a team to constantly, overtly, and critically observe and question its objectives, strategies, and processes in a constructive manner [2]. It determines the smooth operation of the team's cognitive processing system, promotes a better team evaluation of the environment, and assists the team in adopting necessary actions, especially in uncertain environments.

When social heterogeneity in an entrepreneurial team is substantial, members are often prone to subjective biases in communication, resulting in divergent decision-making perspectives. Entrepreneurial teams with higher reflexivity have a higher frequency of introspective activities. Thus, the disturbance of affective conflict in decision-making can be reduced to improve the decision-making quality. When team reflexivity is low, it is easier to have preconceived views on other people's views, and decision-making is easily guided by bias [5]. Therefore, our study suggests that entrepreneurial team reflexivity weakens the negative effects of social heterogeneity on decision-making.

Team reflexivity also influences the effect of functional heterogeneity on entrepreneurial decision-making. A team with a high level of reflexivity discovers problems promptly and promotes brainstorming in its strongly functional heterogeneous teams by dynamically grasping development and environmental changes [5]. Moreover, members of entrepreneurial teams with high reflexivity integrate differences and facilitate the absorption of diverse information, thereby helping the entrepreneurial team make the best decisions.

Therefore, team members with a high level of reflexivity can adequately absorb multiple pieces of information so that the team's differentiated background, knowledge, and skills have been maximized and rationally utilized, ultimately promoting the team to make effective decisions:

H2a: Entrepreneurial team reflexivity weakens the negative effect of social heterogeneity on decision-making quality.

H2b: Entrepreneurial team reflexivity intensifies the positive effect of functional heterogeneity on decision-making quality.

2.4 Moderating Effect of Opportunity Novelty

When the level of opportunity novelty is high, the processes of evaluating opportunities, making decisions, and taking action become more laborious and challenging. The various social attributes of an entrepreneurial team provide diverse educational backgrounds, knowledge bases, and experience, which help the team perceive and evaluate opportunities from all aspects. Hence, the negative effect of social heterogeneity on high-quality entrepreneurial decision-making can be effectively weakened when the level of opportunity novelty is high. However, accumulated work experience often solidifies the evaluation, analysis, and problem-solving mindsets. The decisions made by the entrepreneurial team under existing thinking modes may not be able to meet new market demand, nor can they adapt to the dynamic and fluctuating entrepreneurial environment in later stages, in which opportunity novelty may limit the role of functional heterogeneity in enhancing decision quality.

H3a: Opportunity novelty weakens the negative effect of entrepreneurial team social heterogeneity on decision-making quality.

H3b: Opportunity novelty weakens the positive effect of functional heterogeneity of entrepreneurial teams on decision-making quality.

3 Methods

3.1 Sample

From March 2020 to March 2021, questionnaire distribution and data recovery were conducted for entrepreneurial teams in various industries in several places. A total of 296 questionnaires were distributed with 234 valid questionnaires finally obtained.

3.2 Measures

Variables of entrepreneurial team decision-making quality, entrepreneurial team reflexivity, and opportunity novelty were all measured by well-developed scales [6][7][8]. Different dimensions of entrepreneurial team heterogeneity were measured respectively: age and industry experience were measured using the standard deviation coefficient method by dividing age by the mean; educational attainment and major heterogeneity were measured using the Herfindahl–Hirschman method; functional heterogeneity refers to the formula of Teachman [9]. Age of the enterprise, gender, and field were implemented as control variables.

4 Results

4.1 Common Method Bias, Reliability Analysis, and Validity Analysis

We tested common method bias through Harman's single-factor method. The squared Pearson correlation coefficient of the first factor was 38.351% indicating that there was no significant common method bias.

We performed reliability analysis using Cronbach's α and composite reliability (CR). The Cronbach's α of each variable exceeded 0.7, and the CR of each variable exceeded 0.60 both indicating good reliability.

We used the average variance extracted (AVE) to check convergent validity. The AVE of entrepreneurial team decision-making quality, reflexivity, and opportunity novelty exceeded 0.5, indicating good convergent validity. Additionally, confirmatory factor analysis indicated the fitting result was good.

4.2 Data Aggregation and Correlation Analysis

The Rwg of each variable exceeded 0.7, ICC (1) exceeded 0.05, and ICC (2) exceeded 0.5, indicating that these data are suitable for subsequent regression analyses at the team level. In correlation analysis, entrepreneurial team reflexivity and opportunity novelty were significantly correlated with decision-making quality.

4.3 Hypothesis Testing Results

We used multiple linear regression to implement hypothesis testing. In Model 1, the age of the enterprise, the controlled variable, had a more significant positive impact on decision-making quality ($\beta=0.284$, $p<0.001$). Model 2 examines the effect of different dimensions of the independent variable, entrepreneurial team heterogeneity, on decision-making quality. Entrepreneurial team age heterogeneity was negatively correlated with decision-making quality ($\beta=-0.165$, $p<0.05$). Major heterogeneity was negatively correlated with decision-making quality ($\beta=-0.170$, $p<0.05$). Educational attainment heterogeneity is significantly and positively correlated with decision-making quality ($\beta=0.320$, $p<0.001$). H1a was partially supported, indicating that the greater the age diversity and major diversity in entrepreneurial teams, the lower the final decision-making quality. The education degree diversity of entrepreneurial teams promotes high-quality decision-making, which is contrary to the hypothesis.

Entrepreneurial team industry experience heterogeneity was positively correlated with decision-making quality when testing Hypothesis 1b ($\beta=-0.170$, $p<0.05$), and Hypothesis 1b was partially supported.

The results of Model 3 indicate that entrepreneurial team reflexivity has a moderating effect on the relationship between entrepreneurial team heterogeneity and decision-making quality. With regard to social heterogeneity, team reflexivity had a significant moderating effect on the relationship between age heterogeneity and decision-making quality ($\beta=0.204$, $p<0.1$), and the negative effect of age heterogeneity on decision-making quality weakened when the level of entrepreneurial team reflexivity

was high. The moderating effect of team reflexivity on the relationship between major heterogeneity and decision-making quality was significant (β=0.264, p<0.01). When the level of entrepreneurial team reflexivity is higher, the negative effect of major heterogeneity on decision-making quality is significantly weakened. The result of entrepreneurial team reflexivity in moderating the relationship between educational attainment heterogeneity and decision-making quality did not pass the significance test, but the regression coefficient was more than 0 and the P-value was low. Therefore, Hypothesis 2a is supported.

The moderating effect of entrepreneurial team reflexivity on the relationship between functional heterogeneity and decision-making quality is not supported; thus, Hypothesis 2b does not pass the test. A possible reason is that experience itself is the product of the reflection and integration processes. In the process of team introspection, experience may limit the cognitive scope of the whole to some extent, as a shortcut to thinking later.

Model 4 shows that opportunity novelty considerably inhibited the negative relationship between major heterogeneity and decision-making quality (β=0.126, p<0.1). The negative impact of major heterogeneity on decision-making quality could be weakened in the context of a high level of opportunity novelty. The moderating effect is significant in the positive relationship between educational attainment heterogeneity and decision-making quality (β=-0.355, p<0.01). A high level of opportunity novelty weakened the positive effect of educational attainment heterogeneity on decision-making quality, and the moderating effect of opportunity novelty in the relationship between age heterogeneity and decision-making quality did not collaborate; thus, Hypothesis 3a was partially confirmed. A possible reason is that the collision of views between members of different majors can help the team dialectically regard opportunities from multiple perspectives, improve their understanding of opportunities, and make more flexible and comprehensive decisions. Another reason is that a huge gap in educational attainment is likely to cause a different understanding of their underlying logic about opportunities. Therefore, high-quality entrepreneurial decision-making is difficult to generate with a unanimous consensus.

Table 1. Regression analysis

Explanatory Variables	Entrepreneurial Team Decision-Making Quality			
	Model 1	Model 2	Model 3	Model 4
Enterprise Industry	-0.059	0.014	0.050	0.082
Enterprise Established Time	-0.302***	-0.284***	-0.005	-0.188***
Sex	-0.037	0.088	0.116*	-0.157**
ET Age Heterogeneity		-0.165***	-0.065	-0.036
ET Industry Experience Heterogeneity		0.186**	0.133**	-0.100
ET Major Heterogeneity		-0.170**	-0.223***	-0.180***
ET Educational Attainment Heterogeneity		0.320***	0.119	0.127*
ET Functional Experience Heterogeneity		-0.237***	-0.088	0.087

Team Reflexivity			0.550***	
Age Heterogeneity × Team Reflexivity			0.204*	
Industry Experience Heterogeneity × Team Reflexivity			-0.045	
Major Heterogeneity × Team Reflexivity			0.264***	
Educational Attainment Heterogeneity × Team Reflexivity			0.113	
Functional Experience Heterogeneity× Team Reflexivity			0.049	
Opportunity Novelty (ON)				0.560***
Age Heterogeneity × ON				-0.076
Industry Experience Heterogeneity× ON				0.015
Major Heterogeneity × ON				0.126*
Educational Attainment Heterogeneity × ON				-0.355***
Functional Experience Heterogeneity × ON				-0.249***
R^2	0.097	0.284	0.623	0.605
Adjusted R^2	0.075	0.236	0.576	0.557
F	4.461	5.942	13.445	12.475

Notes: ET: entrepreneurial team; ON: opportunity novelty; ***p<0.01, **p<0.05, and *p<0.1.

In terms of functional heterogeneity, opportunity novelty did not show any moderating effect on the relationship between industry experience heterogeneity and decision-making quality. Simultaneously, it moderated the relationship between functional experience heterogeneity and decision-making quality (β=-0.249, p<0.01). Contrary to our hypothesis, opportunity novelty intensified the negative effect of functional experience heterogeneity on decision-making quality. Hence, Hypothesis 3b was not validated.

5 Conclusion

Major conclusions are as follows: (1) In the aspect of social heterogeneity, age heterogeneity and major heterogeneity of members are too great a barrier to high-quality decision-making. In contrast, educational attainment heterogeneity contributes to high-quality decision-making. (2) Regarding functional heterogeneity, industry experience heterogeneity among members helps generate high-quality decisions, whereas functional experience heterogeneity does not. (3) Team reflexivity weakens the negative effects of social heterogeneity on entrepreneurial decision-making. (4) Opportunity novelty has multiple moderating effects. The negative effect of major heterogeneity on decision-making quality weakens in the context of a high level of opportunity novelty. However, the positive effect of educational attainment heterogeneity on decision-making quality is weakened at the same time, and the negative effect of functional experience heterogeneity on entrepreneurial decision-making quality is further intensified.

6 Contributions

Theoretically, this study extends the studies on entrepreneurial decision-making by elucidating the threshold impacts from heterogeneities of multiple dimensions. It also refines the discussion on the relationship between team heterogeneity and decision-making in entrepreneurship research by delving heterogeneity into social and functional attributes. In addition, it enriches the contextual research of entrepreneurial decision-making from the perspective of cognition, both internally and externally. Practically, it sheds light on entrepreneurial teams to be objective on the differences in attributes and characteristics among members. It is also suggested to weaken the functional evaluation faced with a high level of opportunity novelty.

Authors' contributions

Xing and Wang contributed to the conception of the study; Xing and Liu performed the data collection and analysis; Liu and Zhou performed the manuscript writing of each chapter.

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