

# Analysis of Influencing Factors of Decision-making Behavior on Entrepreneurial Team and Decision Techniques Selection\*

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**Abstract** This paper determines three types of significant factors that influence decision-making behavior in entrepreneurial team through analyzing its behavioral effect evaluation system. Then, based on Analytic Hierarchy Process, it decomposes the three factors into eleven sub-factors and establishes a three-layer progressive order model and then prioritizes all the factors. Finally, this paper constructs a decision techniques selection matrix, whose dimensions are the two most significant factors in the prioritization, in order to discuss how to select the techniques when different influencing factors prevail.

**Key words** entrepreneurial team, influencing factors, decision-making behavior, decision technique

## 1 Introduction

The main part of stating up business is entrepreneurial team, whose achievement is obviously more excellent than personal undertaking. Decision-making behavior in entrepreneurial team is a group process—the team members form group opinions about start-up decision, entrepreneurial target and so on, following a certain decision-making procedure. And such process includes six links, which are personal judgment, opinions exchange among members, personal judgment again, weighing all the personal opinions in group, group judgment and finally attaining decision outcome. Personal opinions would reach agreement and form several chosen proposals in the link of group judgment. Though its process is similar to that in normal group, decision-making in entrepreneurial team has its own distinction, such as the obviously staged decision task and more dependence on team leader and so on.

In academic circle, researches on entrepreneurial team mainly focus on the forming of the team, member changing, social network and so on, seldom on decision-making behavior. The past research on decision-making depended on two paths, which are social psychology and cognitive psychology. And the classic theory of them are Group Thinking Model raised by Janis (1989) and the Information Sampling Model raised by Stasser (1992). What's more, Davis (1973) raised Social Decision Schema Theory to explain the influence of individual preference on decision-making, and Hollenbeck (1995) raised six influencing factors based on Team Lens Model. In addition, other influence factors of decision making include entrepreneurial self efficacy (Noble 1999), risk perception and risk propensity (Mullins 2000), decision pattern of entrepreneur (Sarasyathy 2001), cognitive bias (Simon 2002), and expected return (Chen Zhenhong 2007). Now with the development of information technology, some of them were introduced to the research of behavior, such as Multi-agent Simulation Technology (Li Zhicheng, 2007).

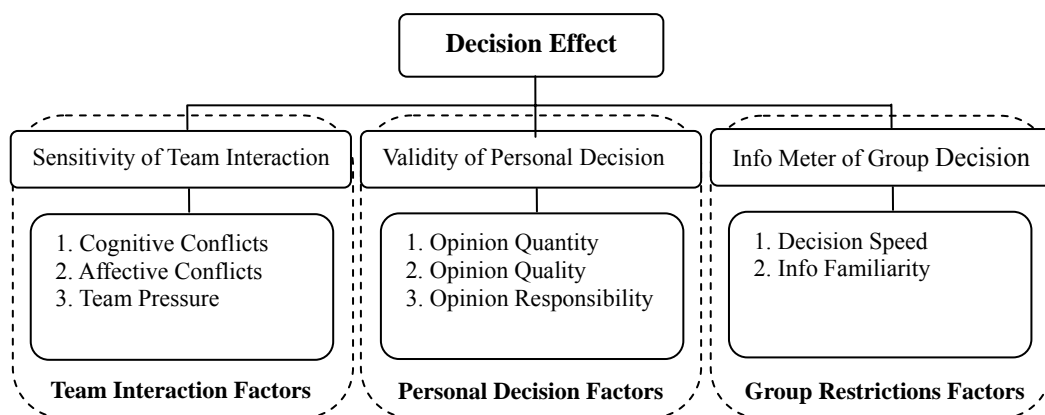
## 2 Influence Factors of Entrepreneurial Team Decision-making Behavior

### 2.1 Analysis on Effect Evaluation System of Decision-making Behavior

Behavioral effect evaluation is an important mean to investigate the process of behavior, through the index of evaluation system, factors that influence decision-making directly can be found effectively. Normally, personal decision-making behavior and the group restrictions on it, interaction behavior among members are the most significant aspects to decision effect. So paper establishes a decision making effect evaluation system from three degrees, which are sensitivity of team interaction, validity of personal decision and information meter of group decision, as shown in Figure 1.

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**Figure 1 Decision-making Behavior Effect Evaluation System**

The first degree reflects the opinion communication and mutual adoption among the members, adoption of member opinions by leaders and pressure of conformity, through observing team pressure, cognitive and affective conflicts. The second degree reflects decision ability of individual, by observing the personal opinion quantity, quality and responsibility. And the last one examines the members' grasp to the decision information, by observing the decision speed and information familiarity.

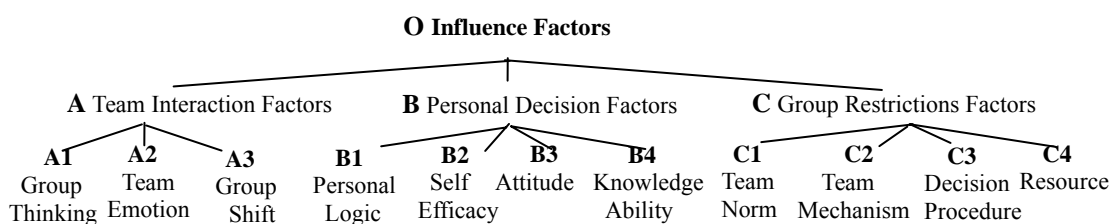
### 2.2 Establishment of Influence Factors System of Decision-making Behavior

According to the construction of the evaluation system, factors that influence team decision making would sorted into three types, which are team interaction factors that influence conflicts forming and opinions exchange among members, group restriction factors that influence individual participation and group judgment, and personal decision factors that influence individual especially the team leaders making decision, as team leaders play a more important role in entrepreneurial team.

## 3 Progressive Order Model and Prioritization of Influence Factors based on AHP

### 3.1 Establishment of Progressive Order Model of Influence Factors

In order to analyze the influence factors of decision-making further, three types' factors would be decomposed into eleven sub-factors. And then progressive order model is established, which includes three layers—the second and third layer are separately made up by the three typed factors named father-factors and the eleven sub-factors. They are all labeled as show in Figure 2.



**Figure 2 The Progressive Order Model of Influence Factors**

#### (1) Team interaction factors

Team interaction factors include group thinking, team emotion and group shift. The first one is that conformity pressure from group restrains the minority opinion. Group thinking phenomenon is universal all over China because Chinese people advocate collectivism and authority other than conflicts. The second one reflects the compatibility of members' friendship, interest, value and target. First of all, behavior of entrepreneurial team bases mainly on the compatibility of emotion. Harmonious relationship makes for cognitive conflicts, but with the growing of team, the compatibility of emotion would transform into cognitive complement, shocking the primary decision pattern. And group shift is that members are inclined to exaggerate their initial viewpoints, making the decision go to extreme easily.<sup>[1]</sup>

#### (2) Personal decision factors

Personal decision factors include personal logic, self efficacy, attitude, knowledge and ability. The first one investigates personal decision style and the use of intuition, which effecting quality of opinions. The second one is confident extent of entrepreneurs on uncertainty management, innovation, social network, opportunity discovery, resource distribution and so on. This one influences the cognition of risk and decision directly. The third one reflects the serious extent of personal decision-making, which along with the last one effect the quantity, quality and responsibility of personal viewpoints directly.

(3) Group restrictions factors

Group restrictions factors include team norm, team mechanism, decision procedure and resource. Team norm points out the behavioral standard accepted by members. Team mechanism mainly includes achievement examining mechanism and confidence mechanism. These two factors affect the zeal and seriousness of individual participation in group decision. Though the effect seems weak in infancy as entrepreneurial team based on emotion firstly, they become stronger with the growth of the team, even stronger than hard rule. Procedure effects the interaction and opinion integration. And resource which includes HR, capital, time and so on is the hard running environment for decision-making behavior.

**3.2 Prioritization of Influence Factors**

According to AHP, firstly build the father factors judgment matrix (as shown in Table 1) and determine the prioritization of Factor A, B, C to influence factors. Then deal with the sub-factors with the same method mentioned above respectively, in order to attain prioritization of each one to its according father factor, as shown in Table A (a), (b), (c). At last, multiply the father factors' prioritization with that of sub-factors and make the result in order, as shown in Table 2.

**Table 1 Farther Factors Judgment Matrix**

	A	B	C	Wi	
A	1	3	4	0.6250	$\lambda_{max} = 3.01$ C.I. = 0.005 R.I. = 0.58 C.R. = 0.008
B	1/3	1	2	0.2385	
C	1/4	1/2	1	0.1365	

**Table 1(a) A sub-factors Judgment Matrix**

	A1	A2	A3	Wi	
A1	1	3	5	0.6333	$\lambda_{max} = 3.011$ C.I. = 0.0055 R.I. = 0.58 C.R. = 0.009
A2	1/3	1	5	0.2605	
A3	1/5	1/5	1	0.1062	

**Table 1(b) B sub-factors Judgment Matrix**

	B1	B2	B3	B4	Wi	
B1	1	2	3	5	0.4609	$\lambda_{max} = 4.019$ C.I. = 0.0063 R.I. = 0.9 C.R. = 0.007
B2	1/2	1	3	4	0.3104	
B3	1/3	1/3	1	3	0.1560	
B4	1/5	1/4	1/3	1	0.0726	

**Table 1(c) C sub-factors Judgment Matrix**

	C1	C2	C3	C4	Wi	
C1	1	3	5	6	0.5512	$\lambda_{max} = 4.023$ C.I. = 0.0077 R.I. = 0.9 C.R. = 0.0085
C2	1/3	1	3	5	0.2724	
C3	1/5	1/3	1	2	0.1098	
C4	1/6	1/5	1/2	1	0.0666	

Note: a. Judgment matrix uses nine calibration methods.

b. Wi is the prioritization result,  $\lambda_{max}$  is the maximum eigenvalue.

c. C.I. =  $(\lambda_{max} - n) / (n - 1)$  C.R. = C.I. / C.R.

**Table 2 Prioritization of All Sub-Factors**

A1	A2	B1	C1	B2	A3	C2	B3	B4	C3	C4
0.3947	0.1623	0.1104	0.0757	0.0743	0.0662	0.0374	0.0374	0.0174	0.0151	0.0091

Take father factors judgment matrix for example to explain the nine calibration method of paired comparison. Firstly, the process of team decision-making is susceptible to members' relationship, whose effect is larger than team restrictions, so team interaction factors are more important than team restrictions, calibrating 4. As the same, an open team can accepts more conflicts of the different personal opinions. This would be good for personal opinions revision. So as far as team judgment efficiency, team interaction factors act a little bit more important than personal decision factors, calibrating 3. And personal decision is the basis of team decision. If someone has big cognition deviation, team restriction factors can remedy it little. From this point, personal decision factors seem a little more significant than team restriction factors, calibrating 2. Then compare the sub-factors by analogy.

In order to attain the prioritization of each factor—Wi, here firstly calculate the multiple multiplication of each row—Mi, then raise Mi to its 1/n power—got wi, at last, make every wi to divides the sum of wi<sup>[2]</sup>. The result is as shown in Table 1. And the consistency check results of the four judgment matrix indicate their maximum eigenvalue are very close to their exponent number and C.R.

are all less than 0.01, proving that each matrix's consistency is satisfied and they are all available.

Table 2 underlies an important founding that group thinking, team emotion and personal logic play the most prominent role in team decision-making behavior. The founding also verifies a series of feature that entrepreneurial team relies more on leaders, emotion compatibility and so on.

#### 4 Decision Techniques Selection for Entrepreneurial Team

Entrepreneurial team decision-making confronts the same low efficiency problem that causes by negative factors as other group decision-making. Select the appropriate decision technique could improve efficiency effectively. The main decision techniques include Brainstorm (BS), Delphi, Nominal Group Technique (NGT), Dialectical Inquiry (DI), Devil's Advocate (DA) [3]. NGT is similar to Delphi that everyone makes decision by himself. The obvious difference between them is that member who joins the discussion can't see each other in Delphi but all have to attend the meeting in NGT. DI likes DA that they both take advantage of cognition conflicts to raise the decision efficiency, but the former has to arrange a person to put forward opposite opinions of members and the latter has to arrange a person to criticize the proposal or the agreement that have been widely accepted by the members.

Base on the analysis and founding above, paper here takes the most two important factors—group thinking and team emotion as dimensions to build a selection matrix(as shown in Figure 3), discussing the selection when different factors prevail.

##### 4.1 Decision Techniques Selection for Entrepreneurial Pioneering Period

In the pioneering period of entrepreneurship, team emotion shows harmonious. The low occurrence of emotion conflicts stimulates the open discussion and cognition conflicts, doing good to raise the quality of decision. In such situation, team decision can use BS, DI, DA which enable discussion face to face, so as to promote everyone expressing his opinions fully, deepen the communication, cut the time, advance information sharing and decision remedy.

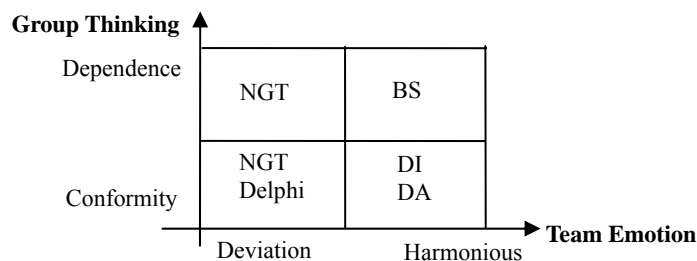
But these three methods can't be used everywhere. In the team that is under large conformity pressure, DI, DA maybe more appropriate than BS. Because DI and DA can stimulate discussion among members while avoid someone suppressing his own non-mainstream ideas. However, BS would indulge the conformity, causing the team decision get close to the majority opinions. Thus, when conformity pressure is weak enough, BS would be more convenient to collect personal ideas.

It's worth noting that the strong sense of identity in the entrepreneurial team in pioneering period easily causes the occurrence of group thinking and blind following to leaders.

##### 4.2 Decision Techniques Selection for Entrepreneurial Developing Period

With the growth of the team and the adjustment of the crew, the hierarchy of team would increase and the emotional conflict would intensify. In this situation, the use of BS, DI, DA makes the decision achievement that is benefit from more discussion can't recover the damage caused by the sharpened emotional conflicts. Therefore, NGT and Delphi are more suitable for the team whose deviation of emotion is obvious. While these kinds of methods can avoid conflicts, they can preserve personal ideas well and keep fairness. But because of the lack of in-depth discussion, individual can't revise his opinions in the link of interaction and the team can't unify the personal opinions easily. So if the team is under large conformity pressure, Delphi can avoid the communications that affect personal judgment.

It's worth noting that these kinds of methods don't supply enough communication, so the study of correlative knowledge before decision-making is very necessary.



**Figure 3 The Decision Technique Selection Matrix**

In addition, if personal decision especially leaders' decision are used to adopt intuition or arbitrary, it must strengthen the training to the crew and the use of scientific decision techniques.

#### 5 Conclusions

This paper analyzes the factors that influence the decision-making behavior in entrepreneurial team and prioritize them based on AHP, and then discuss the decision technique selection. That is to say choose suitable techniques according to different prevailing factors of team in different stage, in order to decrease the effect of negative factors and increase the efficiency of decision. The defect of this paper lies on the lack of ample proof for the calibration that was used in prioritization. And how to quantify the factors and determine their specific influence on behavior will be the research emphasis in future.

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