

# A STUDY OF THE INFLUENCE OF EMOTIONAL INTELLIGENCE ON INDIVIDUAL INNOVATION BEHAVIOUR

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## Abstract

When society overvalues non-intelligence factors related to innovation, the research about emotional intelligence and innovation behaviour is very meaningful. Based on the structure equation model, the paper expounds the influence of emotional intelligence's four dimensions on individual innovation behaviour and explores the mechanism of constructive controversy as a partial mediator. In addition, the samples collected in this paper include the team of the enterprise, the course work of the college students and the innovation competition groups, so the conclusion has extensive application values.

**Keywords:** emotional intelligence, innovation behaviour, constructive controversy, structural equation model

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## Introduction

Schumpeter (1934) defined the concept of innovation for the first time and defined it as "the entrepreneur's re-composition of factors". In recent years, with the support of national policy, Chinese enterprises are also improving the investment in technological innovation. Within the enterprise the employees are the creators and the source of the development. The innovative ability of the enterprise depends on the team composed of employees.

In recent years, the focus on innovation is no longer confined to companies. As China's Prime Minister Li called for "start own business and make innovations" at the Davos in 2014, young people, especially college students, are starting to get more and more attention.

Among various factors related to innovation behaviour in the field of management, the research on emotional intelligence has developed rapidly in recent years. Since Salovey and Mayer (1990) first constructed the complete theory of Emotional Intelligence, the concept has been widely used in pedagogy and management. There are a lot of researches on innovation behaviour and emotional intelligence which still do not explain the mechanism of influence.

The mediating mechanism between emotional intelligence and innovation behaviour is the main point of this paper. Constructive controversy has become an important subject in the study of interaction. Whether constructive controversy can be a mediator between emotional intelligence and innovation behaviour is a very valuable path.

In this study, students sample and employees' samples are adopted, which are based on three situations: classroom, contest and work team. The relationship between emotional intelligence and innovation behaviour will be studied more extensively through three kinds of samples.

## **Literature Review**

### *Emotional Intelligence*

The earliest source of emotional intelligence can even be traced back to ancient Greece. Plato emphasized absolute control of emotion, which was an embryonic form of the modern concept of emotional intelligence. Leuner (1966) was the first person who used the word "emotional intelligence". According to Leuner (1966), emotional intelligence is the ability to control the emotion. Payne (1985) is also one of the first scholars to use the "emotional intelligence" and believed that emotional intelligence has a strong connection with the examination and discussion of emotional problems.

However, the initial study was not mature and not widespread. The people who finished construction of the emotional intelligence's complete theory are the American scholars Salovey and Mayer (1990). According to the study, that emotional intelligence is a subset of social intelligence, including the ability to monitor self and others' emotions, to differentiate emotions and to use emotions to guide thoughts and actions. The study of Salovey and Mayer (1990), which synthesized the research achievements in the 1980s, such as emotion and cognition, artificial intelligence, information processing, neuroscience, emotion regulation and clinical psychology, has become the hotspot of scholarly research.

Furthermore, Baron (1997) took the lead to explore the measuring method of emotional intelligence. In the 1998's doctoral dissertation, Baron pioneered the term EQ (emotional quotient) to indicate the level of emotional intelligence. Baron's theories' models are of mixed orientation, which emphasizes that emotional intelligence is not only a kind of ability, but also involves motives, personality and other factors. Both cognitive factors and non-cognition factors are incorporated into the contents of emotional intelligence.

Salovey and Mayer (1990) chose another path to explain emotional intelligence and insist emotional intelligence as the ability to process emotional information. After a long period of controversy and modification, Salovey and Mayer (1990) further presented a four-factor model of emotional intelligence in 1997. Emotional intelligence is a combination of ability to evaluate and express emotions accurately, to generate the ability to promote thinking, to understand emotions and related knowledge and to regulate and promote emotions. In 2000, to facilitate comparisons with Baron's models, Salovey and Mayer (1990) further simplified their own four-factor model. The four dimensions of emotional intelligence are sequential in the process of development and the ability of the fourth level is built on previous abilities.

Wong and Law (2002) divided the four dimensions of emotional intelligence on theory of Salovey and Mayer (1990): appraisal and expression of emotion in the self; appraisal and recognition of emotion in others; regulation of emotion in the self; use of emotion to facilitate performance. Wong and Law (2002) also developed EI scale for Chinese. This paper will focus on four dimensions which were integrated by Wong and Law.

### *Innovation Behaviour*

Today, innovation is undoubtedly a hot topic in business practice and academic research. Besides the economic significance, many scholars try to interpret the connotation of innovation from the perspective of management. From a large concept, innovative behaviour cannot be simply defined as creativity. The basic meaning of creativity is to do something for the first time or to contribute new knowledge. Innovation has a broader definition: In addition to the meaning of creation, the adoption of products and processes from outside the organization is also the connotation of innovation.

Innovation behaviour includes three levels of object category: Organization, team and individual. Among them, individual innovation behaviour is the foundation of team and organizational innovation. West and Farr (1989) defined individual innovation behaviour as individuals produce and apply new ideas and methods. Farr and Ford (1990) supplemented this definition: individual's ability to guide new and useful knowledge, products, and processes. This paper will focus on individual innovation behaviour.

Starting from Kanter (2000), scholars have studied the specific steps of individual innovation behaviour. The study of Kanter (2000) showed that the initial stage of innovation behaviour is to recognize the problem. Then start with innovative ideas, individual will seek others to support innovative ideas. Finally, idea of innovation will be put into practice and to be carried out in the work environment. Scott and Bruce (1994) had similar viewpoints and divided individual innovations into three steps: Individuals produce ideas and ideas of innovation; promote ideas and find people who support ideas; last step is to realize the idea and turn the original idea into reality.

Scholars also have begun to think more about the concept of innovation in actual working context. West (1987) noted the fact that when an organization is confronted with a challenge or a new task, the process of individuals reset mission goals and mobilize resources to realize performance is also an important part of innovation behaviour. Ramadevi and Sangeetha (2017) found that employee behaviours have a significant positive relation with organization innovation capability of Indian service firms. It is also found that innovation behaviour is also related to perceived behaviour control, subjective norms and attitude towards entrepreneurial intent (Sheoliha, 2016).

The multidimensional dimension of individual innovation behaviour also means a kind of balance. The researchers pointed out that there is some sort of contradiction between the emergence of new ideas and the implementation of that. The concept of individual innovation behaviour contains a game theory of creativity and execution. To achieve higher performance of individual innovation behaviour requires creativity and implementation instead of fantasy.

### *Constructive Controversy*

Constructive controversy has become an important topic in the study of team interaction. Controversy is often regarded as a derogatory word. Nevertheless constructive controversy refers to positive and effective argument. Tjosvold (1998) defined constructive controversy as an open discussion of opposing views for the common good. Johnson and Johnson (1992) argued that the core of constructive controversy is people try to find agreement when ideas, theories, and opinions are

incompatible with others.

Based on Chinese employees and students, scholars such as Tjosvold (1998) have conducted a number of studies on constructive controversy. Tjosvold (1998) focused on 540 members of the self-management team to study the relationship between constructive controversy team's performances. The study revealed the correlation between constructive controversy and good team performance. A scale of eight items was used to measure the constructive controversy in the study, which was widely accepted in subsequent research. Chen and Tjosvold (2002) took a sample of the 32 teams of 126 Chinese MBA students to study the impact of collaborative and independent goals on constructive controversy. The questionnaire contained six items on constructive controversy and the result showed that teams with cooperative goals are more likely to engage in constructive controversy.

Also collecting Chinese sample, Wang et al. (2010) focusing on call centre service team staff conducted a study. The study showed the positive correlation between the employee's synergy and constructive controversy. Especially in China's cultural background, the cooperative target and the organization's synergy promote the constructive controversy. In another study it is found synergetic management is important for enterprise innovation development through factors such as constructive controversy (Bondarenko, 2017).

From the social level, constructive controversy exhibits differently in various cultural backgrounds. From the scene level, the formation of constructive controversy is linked to the type of task and the composition of the team.

## **Research Model and Hypotheses**

### *Emotional intelligence and innovation behaviour*

The mechanism between emotion and innovation has been interpreted theoretically. The most famous research is from Fredrickson (1998). The scholar discovered that experiencing positive emotions could broaden people's minds and build their resourcefulness. Besides, Csikszentmihalyi (1990) also supported positive emotions could encourage people to explore and to expand new information. The process is consistent with innovation behaviour. According to the definition of emotional intelligence, people who have high level of emotional intelligence are more likely to move into positive emotions.

There is another way to link emotional intelligence with innovation behaviour, theory of motivation. Intrinsic motivation affects both birth of new ideas and implementation of ideas. Extrinsic motivation has significant influence on the practice of innovation. Moreover, Goleman (1985), Mayer et al. (2000) all emphasized emotional intelligence's strong connection with both intrinsic and extrinsic motivation.

This paper hopes to be able to explore how specific factors in emotional intelligence affect innovation behaviour. According to researches, appraisal and expression of emotion in the self, appraisal and recognition of emotion in others, regulation of emotion in the self, use of emotion to facilitate performance all affect innovation behaviour. Among them, regulation of emotion and use of emotion to facilitate performance have more significant effect.

Appraisal and expression of emotion in the self and others appear to be not significantly correlated with innovation behaviour. However, in the whole theoretical framework of emotional intelligence, appraisal and expression of emotion is the basis

and acts as preconditions for assessment and utilization of emotion. Besides, West (1987) emphasized that use of interpersonal relationships is an important guarantee for implementation of innovative ideas. Whatever people do to build a beautiful relationship, the process is associated about appraisal and expression of emotion.

Based on the above, this paper formulated the following hypothesis:

H1a: Appraisal and expression of emotion in the self has a positive effect on innovation behaviour;

H1b: Appraisal and expression of emotion in others has a positive effect on innovation behaviour;

H1c: Regulation of emotion in the self has a positive effect on innovation behaviour;

H1d: Use of emotion to facilitate performance has a positive effect on innovation behaviour.

### *Constructive Controversy as a Partial Mediation*

People with high emotional intelligence are better at controlling and managing their negative emotions, choosing the right way to express their feelings, and sharing emotional experiences with others. The exchange and interaction about emotion are important prerequisites for constructive controversy.

Tjosvold (1998) did an empirical study and found that constructive argument was more likely to appear when team members were under positive emotion. According to the framework of emotional intelligence, people with high emotional intelligence are more likely to have positive emotions, thus more likely to form constructive controversy. In addition, the constructive controversy is the process of seeking same and keeping difference which requires a sense of collective identity. The establishment of sense of collective identity relies on the understanding and sharing of emotion among the members. It is clear that members of the group with high emotional intelligence will be more likely to establish collective identity and thus help constructive controversy.

In four dimensions of emotional intelligence, the use and regulation of emotion are directly related to constructive controversy. Fredrickson (1998) believed that positive emotions could make group members more receptive to the views of others during discussions and contribute to improving the effectiveness of the discussion. Hence, regulating and using emotions properly help to create a harmonious atmosphere of discussion within the group and to promote constructive controversy.

The other two dimensions, appraisal and expression of emotion in the self and others, are also foundations for constructive controversy. Sometimes, constructive controversy is unsustainable because of emotional conflict caused by cognitive conflict or task's conflict in the debate (Zhou, 2005). In order to confine the argument to the discussion of the task without creating an emotional conflict, the assessment of self and others' emotions is obviously of great importance to the continuance of constructive debate

Thus, this paper proposes the following:

H2a: Appraisal and expression of emotion in the self has a positive effect on constructive controversy;

H2b: Appraisal and expression of emotion in others has a positive effect on constructive controversy;

H2c: Regulation of emotion in the self has a positive effect on constructive controversy;

H2d: Use of emotion to facilitate performance has a positive effect on constructive controversy.

Tjosvold and Johnson (1977) demonstrated that team members who experience constructive controversy are more likely to understand other people's positions and appreciate others' views. At the same time, they will also be more actively to promote their views and implementation of the plan which is the final phase of innovation behaviour.

Constructive controversy plays an important role in innovation: to help team members communicate ideas, do exploration and discussion and clarify innovative intentions (Zhang, 2013). More importantly, constructive controversy can strengthen team members' control over innovation behaviour and help team members to make correct judgments. Therefore, constructive debate is an important process of group discussion and shows a positive and open atmosphere. In such an atmosphere, the views of team members can be shared better. This atmosphere can be considered as a prerequisite for innovation behaviour.

Thus, this paper proposes the following:

H3: Constructive controversy has a positive effect on innovation behaviour.

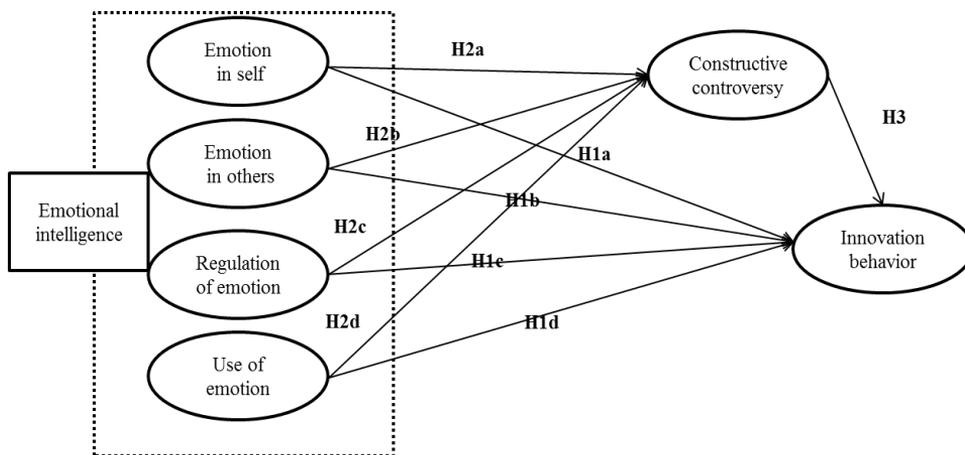


Figure 1. The Research Model and Hypotheses

Considering that even if there is no constructive argument, the dimensions of emotional intelligence still have a highly positive correlation with innovation behaviour. Based on the above, this paper formulated the following hypothesis:

H4a: Constructive controversy is the partial mediator between appraisal and expression of emotion in the self and innovation behaviour;

H4b: Constructive controversy is the partial mediator between appraisal and expression of emotion in others and innovation behaviour;

H4c: Constructive controversy is the partial mediator between regulation of emotion in the self and innovation behaviour;

H4d: Constructive controversy is the partial mediator between use of emotion to facilitate performance and innovation behaviour.

Figure 1 illustrates the research model, including the hypotheses.

## Empirical Research

### Participants

Considering the diversity of individual innovation behaviour in students' teams and work teams, this paper tries to collect the data from schools and companies. In this study, a total of 250 questionnaires were issued, 242 questionnaires were collected, and 238 among them are effective questionnaires (effective recovery rate is 95.2%).

Student samples are collected from Shanghai University and snowballing sampling are adopted which means where participants recruit other participants for a test. Employees' samples are mainly from well-known enterprises from China Anhui Province's Economic and Technical Development Zone. The committee of the zone helped us to distribute questionnaires.

Among participants, 148 are female and 90 are male. Ages of 101 participants ranged from 18 to 28, 121 participants ranged from 29 to 39 and 16 participants were over 39 years old.

According to the different status of the participants, three kinds of innovative scenarios are set up: classroom, contest and work team. 118 participants completed the survey based on innovation behaviour in work teams, 71 participants were based on innovation in the classroom (team for course) and 48 people completed the questionnaires were based on contests (for example, Creative Challenge Cup organized by Ministry of Education).

### Instruments

Emotional intelligence's four dimensions were measured by Wong and Law (2002) Emotional Intelligence Scale (WLEIS). Every dimension has four items and ratings are completed on a seven-point scales ranging from 1 (strongly disagree) to 7 (strongly agree). Some examples of the scale include "I have a good sense of why I have certain feelings most of the time", "I have a good understanding of my own emotions".

About constructive controversy, the 8-item scale was selected. Subjects were asked to answer on a 7-point scale (1=strongly disagree; 7=strongly agree) about their degree of agreement. Example likes "We seek a solution favourable and acceptable to all team members".

Innovation behaviour was assessed in nine items from Scott and Bruce's (1994) innovative behaviour measure, which had the highest factor loadings according to Yuan and Woodman (2010). The response scale ranged from 1 (not at all) to 7 (very often). Example likes "I put forward new ideas about difficult things".

Reliability refers to the degree of consistency or stability of the measure. Cronbach's Alpha was used to assess reliability of the research. Table 1 shows Cronbach's alpha factors of all variables were above 0.8 which means a high degree of consistency.

**Table 1. Cronbach's Alpha Factors of All Variables**

	Emotion in Self	Emotion in Others	Regulation of Emotion	Use of Emotion	Constructive Controversy	Innovation Behaviour
Cronbach's Alpha	0.909	0.920	0.890	0.923	0.940	0.958

### Structural model

Confirmatory factor analysis (CFA) was adopted to assess whether the measurement model fits the sample data adequately or not. In this study, the model includes two endogenous and latent variables: innovation behaviour and constructive controversy. Main exogenous and latent variables are emotion in self, emotion in others, regulation of emotion and use of emotion. First,  $X^2/df$  should be below 3. This model's Chi-square statistic ( $X^2$ ) was 654, degree of freedom (DF) was 284, and  $X^2/df$  was 2.306. Besides that, other indexes could be found in table 2.

**Table 2. Fit Index of SEM**

<i>Test statistic</i>	<i>Preliminary fit criteria</i>	<i>Results</i>
<i>Absolute fit</i>		
$X^2/df$	< 3.00	2.306
RMSEA	< 0.08	0.074
GFI	> 0.90	0.831
AGFI	> 0.90	0.791
<i>Incremental fit</i>		
IFI	> 0.90	0.935
CFI	> 0.90	0.935
NFI	> 0.90	0.891
<i>Parsimony fit</i>		
PCFI	> 0.50	0.817

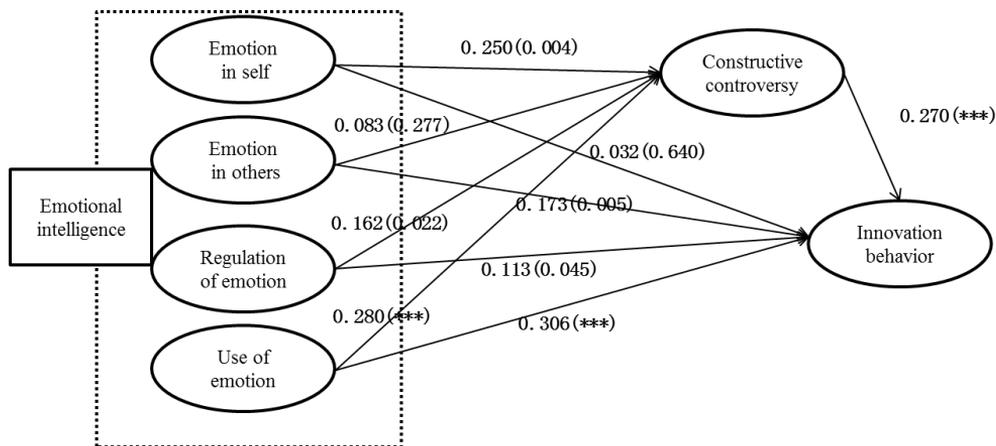
Key indicators like CFI, IFI accorded with the standard. Table 3 and Figure 2 show inter correlations for all the variables.

**Table 3. Inter Correlations for All the Variables**

	Estimate	S.E.	P
Innovation behaviour <--- Emotion in self	.032	.069	.640
Innovation behaviour <--- Emotion in others	.173	.061	.005
Innovation behaviour <--- Regulation of emotion	.113	.056	.045
Innovation behaviour <--- Use of emotion	.306	.057	***
Constructive controversy <--- Emotion in self	.250	.087	.004
Constructive controversy <--- Emotion in others	.083	.077	.277
Constructive controversy <--- Regulation of emotion	.162	.071	.022
Constructive controversy <--- Use of emotion	.280	.068	***
Innovation behaviour <--- Constructive controversy	.270	.059	***

Note: \*\*\* ( $P < 0.001$ )

Thus, H1a and H2b fail and H1b, H1c, H1d, H2a, H2c, H2d, H3 all stand.



**Figure 2. Path Coefficients of All the Variables**

### *The Mediating Effects*

The mediating effects of constructive controversy between emotional intelligence and innovation behaviour were tested for a significance by adopted Bootstrap estimation procedure in AMOS (a bootstrap sample of 1000 and 95% confidence intervals were specified). The bootstrap test actually relies on the 95% confidence intervals from the empirical distribution of indirect effect estimates. MacKinnon (2012) pointed that the bootstrap method yields the most accurate confidence intervals for indirect effects.

If “0” is not included between upper bound and lower bound, effect is significant. When both indirect and direct are significant, there would be a partial mediator. Only significant indirect effect, there would be a full mediation.

H4a: Constructive controversy is the partial mediator between appraisal and expression of emotion in the self and innovation behaviour;

The indirect effect’s range between emotion in self and innovation behaviour was (0.028, 0.125), indirect effect was significant. The direct effect’s range between emotion in self and innovation behaviour was (-0.089, 0.167), direct effect was not significant. The H4a fails and constructive controversy is the full mediator between appraisal and expression of emotion in self and innovation behaviour.

H4b: Constructive controversy is the partial mediator between appraisal and expression of emotion in others and innovation behaviour;

The indirect effect’s range between emotion in others and innovation behaviour was (0.011, 0.070), indirect effect was not significant, and H4b fails.

H4c: Constructive controversy is the partial mediator between regulation of emotion in the self and innovation behaviour;

The indirect effect’s range between regulation of emotion and innovation behaviour was (0.015, 0.090), indirect effect was significant. The direct effect’s range between regulation of emotion and innovation behaviour was (0.001, 0.212), direct effect was significant. The H4c stands and constructive controversy is the partial mediator between regulation of emotion in the self and innovation behaviour.

H4d: Constructive controversy is the partial mediator between use of emotion to facilitate performance and innovation behaviour;

The indirect effect’s range between use of emotion and innovation behaviour

was (0.034, 0.041), indirect effect was significant. The direct effect's range between use of emotion and innovation behaviour was (0.197, 0.431), direct effect was significant. The H4d stands and constructive controversy is the partial mediator between use of emotion to facilitate performance and innovation behaviour.

### Conclusions

According to the above analysis, except expression of emotion in self, other three dimensions of emotional intelligence all have a positive effect on innovation behaviour. Especially, the correlation between the use of emotion to facilitate performance and innovation behaviour is most significant. Moreover, except expression of emotion in others, other three dimensions of emotional intelligence all have a positive effect on innovation behaviour. About mediating effect, constructive controversy is the partial mediator between regulation and use of emotion and innovation behaviour. Even though expression of emotion in self cannot directly activate innovation behaviour, through constructive controversy (as a full mediator), the factor still plays an important role in promoting innovation.

On this account, in the formation of a team, leaders cannot only investigate the general intelligence of the team member, but also emotional intelligence. In addition, team interaction behaviours such as brainstorming are often used in various innovation groups and classrooms. The paper provides a sufficient theoretical support for this behaviour: constructive controversy can promote individual innovation behaviour. However, it is necessary to point out that the debate in the group can easily lead to emotional confrontation. Team leaders also need high emotional intelligence, to identify antagonism among the group and intervene, so as to promote innovation performance.

It should be noted that the paper has some limitations. The most obvious disadvantage is that the study did not differentiate the team and the individual levels. Questionnaires were self-statement forms and emphasized the subjects' personal perception. If the paper could highlight the team level and explore team's innovation behaviour in the design of the questionnaire and the use of the multilayer analysis model in the data processing, conclusions would be more rigorous. Besides, although this paper validates the positive impact of constructive controversy on innovation behaviour, some scholars pointed out that there is a more complex mechanism between them. Zhang (2013) thought the interaction between constructive controversy and high time pressure has a significant negative impact on college students' innovation behaviour. MacKinnon (2012) noted that in complex situations multiple mediation variables are needed to explain the relationship between an independent variable and the dependent variable. In particular, the intermediary chain needs to be established for a more complete intermediary model.

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