

# The explorative study of decision entrapment process: case study approach

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## Abstract

This paper explore the processes of decision entrapment behavior, it means when decision makers faced the negative result of their prior choices and still want to invest more resources on it. The reasons why people adapt such entrapment behavior are two main concerns, one is cognitive heuristic effect, and the other is the escalation of commitment. But both of theses two approaches are too narrow, they only focus on individual level factors. Therefore, Ross & Staw (1986) proposed a new dynamic process model of the entrapment behavior, which cover individual and organizational level. They think there are four determinants affect the entrapment behavior, which are project determinant, psychological determinant, social determinant, and structural determinant.

The object of this research is to verify the Ross & Staw's model through the case study method. We choose the Mass-Transportation System in Taipei as the entrapment case. The MRT Mucha Line is famous with its most expensive cost in the whole world. And this medium capacity system also did not fit into the other system in Taipei, which cause much more resources waste and customers inconvenient.

We collect over 2000 documents in the past 20 years, which are from the newspaper, magazine, and some official documents. Then we used the pattern matching as the analysis concept. The results are four determinants have been supported, but not all of the sub-factors are also supported. And the sequential of determinant appearance were not like the model expected. We also find the new factors that are Taiwan people particular owed, such as face-saving (in Chinese culture context), political factor, and the structural inertia.

Finally, we draw four propositions from the results. 1.If political factor affect the decision process too early, it will cause more resources waste and make withdraw more difficult. 2.In the structural determinant, professional technology and knowledge should be add into it. And if these two factors affect the entrapment process in the early stage and are not replaceable, then it will make entrapment behavior more serious. 3. When decision-maker does not have to be responsible for the failure choice, and his character are face-saving, dominant leadership style, then he will justify the choice and his behavior. The entrapment behavior will last. 4. When the organization involves the entrapment process, it also has the technical and knowledge superior perception then the organization will tend to ignore the negative information. And the entrapment process will keep going on.

Keywords: Decision making, Entrapment process, Escalation of commitment, Case study method, Pattern matching,

## 1. Introduction

Among recent research, the perspective of rational decision has been challenged repeatedly, especially the entitled 'decision entrapment' has been attracted great attention from researchers. The conception of 'decision entrapment' could be given a variety of titles by researchers, for example, some has been entitled 'sunk cost', 'escalation conflict', and 'escalation of commitment' (Bazerman, Beekun & Schoorman, 1982; Bazerman, Guiliano & Appleman, 1984; Conlon & Wolf, 1980; Staw, 1976; Staw & Fox, 1977; Brockner, Nathanson, Friend, Harbeck, Samuelson, Houser, Bazerman & Rubin, 1984; Brockner, Shaw & Rubin, 1979; Brockner, Rubin & Lang, 1981; Brockner & Rubin, 1985; Rubin & Brockner, 1975; Arkes & Blumer, 1985; Christensen-Szalanski & Northcraft, 1985; Northcraft & Wolf, 1984; Thaler, 1980). However, these titles are all concerning the investigation of the phenomenon of decision entrapment. So, what is decision entrapment? In brief, when decision-maker face a series of negative consequences of actions, they continue to adhere to previous decisions and have to invest more resource and efforts, which will compound the original situation.

Regarding the analyzing of determinants of decision entrapment, many researchers point out the phenomenon of entrapment and escalation conflict is a complicated process. There might be lots of factors affecting decision-makers' actions when they become involved with escalation conflict and entrapment behavior. ( Brockner, Shaw & Rubin, 1979; Brockner, Houser, Birnbaum, Lloyd, Deitcher, Nathanson & Rubin, 1986; Caldwell & O'Reilly, 1982; Ross & Staw, 1986; Staw & Ross, 1987; Whyte, 1986) The regarded factors of these researchers can be grasped from four dimension, including economic rationality, socialization, self-representation, and individual difference. (See Tab. 1)

The economic rationality is based on the rationality model, emphasizing the fact that man will calculate the value and cost of action, and then making beneficial decisions. Individual will consider entrapment behavior as a subjective

**Tab. 1 Related findings of entrapment behavior**

Dimension	Factors	Statements	Research findings	Researchers
Economic rationality factor	Rational decision	The aims of the decision are achieving maximum subjective expected utility. Decision-makers will look out for the most subjective benefit in economic terms.	The research result indicates that the escalating commitment will increase when the success probability is high, and the goal is high value.	Ruin & Brockner, 1975.
Social factor	Modeling	Social comparison theory argued that when people stay in uncertainty situation, they would model other's behavior. Modeling is also a basic learning procedure. Entrapment behavior depends on if there is a suitable model for his action.	The result of the research indicates that the presentation of the model truly will affect the degree of the behavior entrapment.	Festinger, 1954; Brockner, et. al, 1984
	Group	From the risk shift point, group like organism will have the tendency of taking the risk. From groupthink point, maintain the consistency and illusion of invulnerability are why group will continue to escalate into actions of failures.	The result of the research proves that a group decision is like an individual one, resulting in entrapment behavior.	Bazerman et al, 1984
Self-representation factor	Face-saving	Many reasons of social behavior are people trying to be looked well in the eyes of other people. They want to protect self-esteem, or match the social expectations. In brief, the reasons for social behavior are based on self-representation.	When decision-makers are exposed to the situation of high social anxiety in front of other people, the individual decision behavior compounds entrapment behavior.	Baumeister, 1982; Brockner, Rubin & Schlenker, 1980; Snyder, 1981
	Self-diagnostic	When the actions are viewed as related to self-revealing, or self-identity, individual will increase commitments to the actions. Self-diagnostic is a need to maintain self-concept or identification and consistency of self-image.	The result of the research indicates if the behavior is connected with self-diagnostic, decision-makers' behavior entrapment will be truly affected.	Brockner et. al, 1986
Individual difference		In conceptual level, some characteristics of personality should have influence on entrapment behavior, but the research findings didn't show any obvious relations. The reasons might be subject's reaction mainly emerges from situational factors, and is less affected by the influence of individual difference.	However, according to Houser's research, when subjects are exposed to a vaguer and unstructured situation with entrapment conflict, some personality characteristics truly affect the degree of entrapment.	Tiger, 1980

**Tab. 2 Four determinants of dynamic process model of Ross & Staw (1986)**

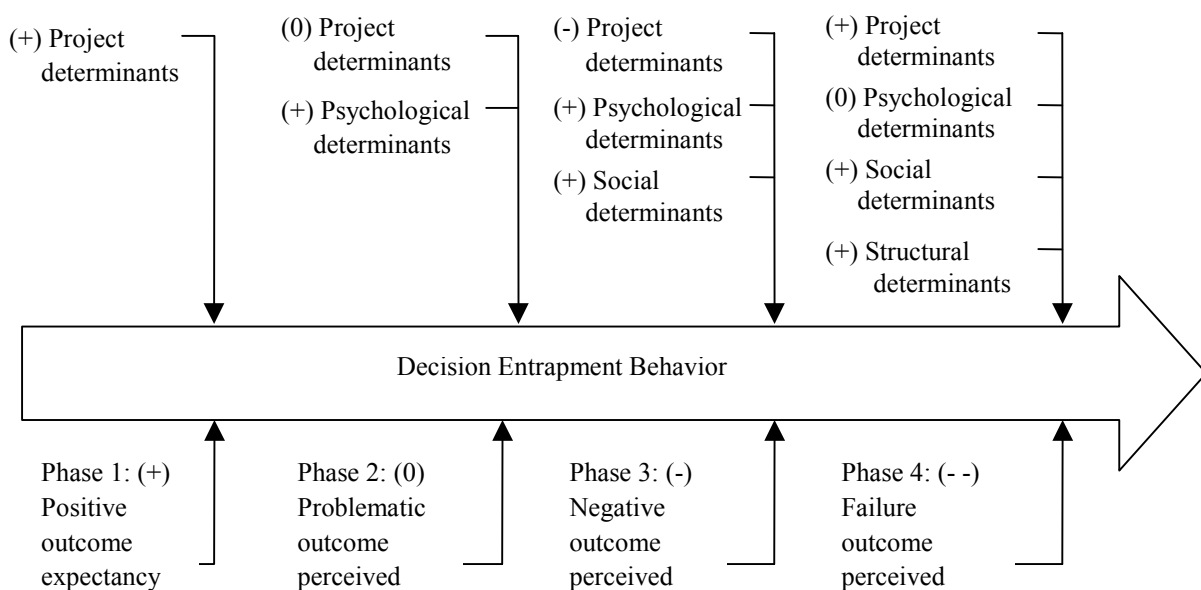
Determinants	Variables	Description
Project	Long-time investment	The illusion of the longer people wait, the more possibility of repayment will deserve.
	Redundancy value and closing costs	When it is impossible to achieve the goal, and the resource drawn upon has surplus value. Then the cost for finishing the action is too high for people to withdraw from the project.
	Probability of success and the circulation of reinforcement	The higher probability of success and the higher value of the goal make it harder to withdraw. Previous success makes it much more difficult to finish the action, and partial reinforcement makes it uneasy to withdraw from the project.
	Self-justification	People justify themselves for internal self-concept and the external impression of others. Withdrawal is equal to admitting failure, and then self-concept and self-image are wrecked.
	Self-inference	Individual review whether his/her behavior corresponds to individual value and preference or not. He/she will protect 'self-effectiveness' or 'rationality image'.
Psychological	Information processing	Entrapment behavior is explained by cognitive heuristics of information process. For example, there are two factors having influence on behavior: (a) Maintenance of self-belief: when information is not clear, individual will find unreal reasons to reject the information. Or individual will narrow down the search of information in order to get consistent information. (b) Well-learned scripts: the scripts have been imprinted on deep in our mind and culture. For example, we always believe that turn around situation will appear, or when we persistent, we will succeed some day.
	Face-saving and external justification	The failure will make individual feel disappointed. They think other people will have a bad impression of them, and so would like to make amends.
Social	External binding	The social identity of individual is restricted by behavior, and is binding to his/her external situation.
	Competition	The situation involving competition will have a great tendency to lead to entrapment behavior than none competitive situation.
	Model and norms	Individual will model on other behavior or social norms.
	Negative effect of economic and technique	When organizations proceeds one project, it probably will set up related departments, purchase equipment, improve techniques, employ workers, penetrate markets, etc. Therefore, decision-makers should consider these as losses, when they have to withdraw from the project.
Structural	Political support	During the execution of the project, the intervention of the authorities, or support from political influence and interest groups will result in the continuation of the project.
	Inertia	In the bureaucratic system, when actions have become routine, routine followings without considering how to implement improvements will make organization more difficult to reevaluate, and hard to change.
	Institutionalization	When the project or action tightly combines with the value or goals of an organization, or becomes part of organizational culture and group norms, the project or action will be harder to cancel.

and predictable mistake. The socialization factor explains escalation behavior on the grounds of modeling, impression modification and group mechanisms. The self-presentation factor emphasizes the mechanism of face-saving, in accordance with social expectation, maintenance self-identification consistency, and the conception of self-protection. The individual difference factor mainly explores individual characteristics and personality having influence on entrapment behavior.

Among recent research, there are two primary theories that have received more support. One is Staw's justification theory, which adopted the impression modification and cognitive dissonance theory. He though behavior entrapment resulted from the mechanism of 'self-justification'. The other one is Kahneman and Tversky's prospective theory, which adopted the information processing perspective. They claimed that the function of 'certainty effect' would result in distorting perceptual value, which is also the main cause of behavior entrapment. However, in comparison, the later theory is more acceptable in empirical data (Lin, 1995).

## 2. Ross and Staw's dynamic process model

In the above we discussed the dimensions influencing decision entrapment as static decision research. It emphasizes decision behavior at a certain time, and never tries to construct a dynamic and process model to explain decision entrapment. Therefore, we would like to introduce a process framework of entrapment behavior below. (See Figure 1)



**Fig. 1 Entrapment behavior model of Ross & Staw (1986)**

In 1986, Ross and Staw put forward an integrative, dynamic process theory, which incorporated every possible determinant revealed in other research. This theory improved two defects existing in previous theories: the emphasis of the level of individual decision, making focus on a certain time period without concerning dynamic process. Instead, Ross and Staw's model revealed the dynamic processes of entrapment and withdraw behavior. Ross and Staw (1986) indicated that there are four kinds of determinants having either positive or negative influence on entrapment behavior, and each determinant includes many variables. (For content and instruction of the determinants, see Tab. 2) The pattern of decision entrapment behavior will change with time and over stages. (See Fig. 1)

First they presented the change of consequence of actions by setting stages apart. Proceeding through the stages, the consequence of actions gradually becomes worse; it is because that the entrapment behavior occurs in the negative or failure situation. The four determinants revealed in the theory have influence on behavior in different degree with different stage. For example, at the first stage, the influence of project determinant, composed of the variables of decision-makers' rational evaluation, optimistic estimation of probability, and the value of consequence, cause decision-makers to make greater commitment in their behavior and make them to take actions. At the second stage, decision-makers perceived the consequence of actions and the original expectation of goal were unpromising. Although long-time investment makes decision-makers reinforce commitment to their actions, the lessening of expected probability of success counteracted the influence of the project determinant. Simultaneously, the influence of the psychological determinant, including the variables of successful experience, self-justification, self-inference and information distorting, causes decision-makers to take the original action with great commitment. At the third stage, the consequence of actions becomes much more unpromising and decision-makers also become very tentative about their actions to achieve success. Illusion, resulting from long-time investment, which is a variable of the 'project'

determinant, is vanishing gradually. Also the project determinant has influence on the commitment of actions to convert positive into negative. In addition, the psychological determinant still has intensive influence. What's more, the direct influence of the social determinant, composed of the variables of face-saving, external binding, competition and norms, causes decision-makers to be exposed to the situation of negative consequence, but they still pledge themselves to follow the action. At the fourth stage, the consequence of actions becomes incessantly worse. At this stage, it has been impossible to achieve the goal. From economic rationality perspective, however, even though decision-makers are obviously exposed to the situation of negative consequence, they still decide to adhere to their actions due to the following reasons, the consideration of surplus value and high cost of finishing the actions, which are two variables of the project determinant; involvement with the social determinant; the structural determinant composed of variables of political influence, inertia and institutionalization.

### **3. Method**

It is more difficult to collect empirical data to test the Ross & Staw's model. It is because that the model takes the decision entrapment behavior as a dynamic process, which is concentrating on organizations rather than on individuals. Therefore, we considered the way to verify the model and modify the theory via a case study. On the one hand, the explorative analysis via case study which produced ample information to induce new framework of the theory. On the other hand, the processes can be verified by making use of dynamic characteristics of a case study data.

Although it is not very common to verify a model by using a case study method, it is probably suitable to apply this method to the study entrapment behavior. The process of entrapment behavior is quite complicated and lasts for a long time, so it is impossible to analyze all factor which the traditional theory have focused on. However, the abundant and dynamic characteristics of case study method satisfy the requirements of decision entrapment research.

This research will investigate the model of decision entrapment posed by Ross and Staw (1986) via the method of case study. The researcher will present a real case to investigate the complicated processes and determinants of entrapment behavior. Although it is impossible to provide empirical data for testing the hypothesis, but we still can adopt different analytic strategies to investigate the concepts and framework of the theory by case study method. Furthermore, we can induce and generalize new findings that were never discussed in the theory by truly and in-depth understand of phenomenon through case study. That is to say, in the verification and establishment of the theory, we provided with qualitative data, which is different from the quantitative data from experiment and questionnaire. We proceeded with non-traditional linear method (hypothesis →testing) to establish a theory. We used the following circular pattern to verify and revise the theory: from theory→proposition→qualitative data→pattern matching→renew or establishing the proposition.

#### **3.1 The selection of the case**

This study chooses the construction of Mucha Line of Mass Rapid Transportation system (MRT) as its subject based on the three reasons described below. (1) There had been corruption, defects and accidents reported during the period for designing, constructing and testing the Mucha Line. (2) The budget for construction of the Mucha Line has to be increased many times an additional budget. Compared to similar systems in foreign countries, the cost of the Mucha Line construction is more than twice as high, and it is the most expensive medium capacity MRT system in the world. (3) The construction of the Mucha Line was tended out contractors in 1987, and started construction work in 1988. The original completion date was set for the end of 1991, but the Mucha Line came into operation on 28 March 1996. After almost eight years, the Mucha Line only of 10.5 kilometers was finally completed. These three characteristics corresponds to the definition of entrapment behavior set out in related documents: a kind of decision processes that happens when individuals or groups are exposed to a continuously worsening when they escalate commitments to previous decision, and make an attempt to convert previous investment into positive result by continuing actions. Therefore, we selected the MRT Mucha Line as the subject to analyzing the construction processes.

#### **3.2 Data collection**

The data source of this study mainly collected after the establishment of MRT Construction Bureau in 1986 was mainly acquired from a variety of newspapers and magazines concerning MRT Bureau work, the designation of medium capacity, the construction of the Mu-Cha Line, and Taipei city council and councilors' inquiry report and subsequent statements. The source of the articles was from newspaper agency's interior file archives. In the interim, the consistency of the news reports was ensured through collation and comparison of the same report from different newspapers.

#### **3.3 Analyzing strategy**

The analyzing strategy of this study was to extract important reported events, on the basis of time dimension, and

then briefly describe the procedures of the MRT Mucha Line construction. A detailed analyzing strategy followed, examining the relationship between the theory and collected data by means of pattern matching. This kind of analyzing strategy is suitable for different pattern of predictor, determinants and the relationship between dependent variables (Campbell, 1975; Yin, 1989).

#### **4. The first Taipei MRT System—briefly history of Mucha Line**

Since there are so many unexpected obstacles and controversy issues in the planning and construction process of Mucha Line. This study will use a story telling way to describe the main events of Mucha line, then we will proceed the pattern matching analysis.

##### **4.1 The designation of Taipei MRT System: comprised between two systems**

In 1979, the mayor of Taipei city, Lee Deng Hui, ask Bureau of Public Works to plan one medium-capacity rapid transit system from Hsintien to Tamshui. But in the same time, the Ministry of Transportation and Communications had also finished the high-capacity rapid transit system plan. Therefore, the Executive Yuan decide both of the two systems would be accepted, the Mocha Line adopt medium-capacity system, the other three adopt high-capacity system. The reasons why Taipei City Hall insist medium-capacity system are low construction cost, short construction time, the return rate is fast and so on. But in the other cities, most medium-capacity systems were used in low population density area, never used for the main transportation tools. Actually, one of the consequences of the mixed system was redesign the MATRA electric trains, they give up the well-run design, 2 cars system, and adopt 4 cars trains system, therefore it can increase the per hour capacity. But this experimental design change also caused serious electric and mechanic integration problem.

##### **4.2 Fight between city hall and contractor MATRA**

There is no particular argument between MATRA and Taipei City government in the first 3 years (1987-1990). But in the end of 1992, the relationship between them had becoming worse and worse. MATRA did not satisfy about payment timing and accident prevention, so they sent the worker back to France and cause suspension of work. And the other hand, Taipei City government also did not approve the deadline extension of performance bond by MATRA. Although MATRA had backed to work on March 22, 1993, but two parties still not reach agreement on the construction memo.

In 1993, October 6, the Commerce Arbitration Council adjudicated Taipei City Government had to pay MATRA 10 billion fine, because the delay of construction schedule cause MATRA suffer huge lost. But 4 years later, the Taiwan Highest Court made another total different adjudication, Taipei City Government did not have to pay the 10 billion fine. In the end of May 1996, the contract negotiation between MATRA and Taipei City Government had been broken. MATRA finally withdrew from operation and maintenance of Mucha Line.

##### **4.3 The crossbeam cleft problem of Mucha Line**

November 1, 1993, the investigating committee, which is organized by Ministry of Transportation and Communications proposed a suggestion, which is tear down existing Mucha Line and build new one. November 11, 1993, Department of Government ethics pronounce there were serious disadvantages in Wanfang Hospital station construction. And these disadvantages could possible cause station building fall apart. November 17, 1993, the Professional Structural Engineer Society said they were very worried about the crossbeam cleft problem of Mucha Line. Feb. 27, 1994, Department of Rapid Transit Systems, Taipei City Government, spent 50 millions to re-enforce 7 beams which had serious cleft problems. On the April 13, 1994, Taipei City Government ran the loading capacity testing, and there were serious arguments between civil engineers and government, the civil engineer said the cleft problems of Mucha line girders could cause suddenly falling apart crisis. The Taipei city government did not agree on this saying, they thought it is too early to jump to the conclusion, but it is definitely safe in next five years of operation time. As to 20 or 30 years later, then they were not sure about the safety. In the end of 1994, the mayor of Taipei city, Chen, Shui-Bian, 1994-1998, proceeded an entirely review on Mucha Line. The review committees found the clefts of crossbeam were the major problems of Mucha Line, they suggest government, before formal operation, more than 300 girders must be reinforced, this could cost around 2 billion dollars and 6 months.

##### **4.4 The accidents of MATRA automatic train**

On May 5, 1993, the rubber-tire of automatic train got fire in the dynamic testing process. In June 1993, the brake of automatic train had been locked again. In July 1993, the investigating report of fire accident were finished, reasons of the fire accident were the IC chip failure of braking system. In the beginning of August, another electronic accident happened. On September 24, another rubber-tire fire happened again. Department of Rapid Transit Systems thought it

was the systematic designing problem of MATRA, which could be caused by disintegration between propeller and brake system.

In 1995, the automatics train of Mucha Line happened 3 flat tire accidents. In May 1996, the locked brake accident happened again, and it caused operation shut down for 76 minutes. In June 1996, the main computer had inappropriately shut down, and caused operation shut down for 4 hours. In September 1996, the system also shut down for 63 minutes.

#### 4.5 The formal operation deadline

The Taipei city government had promised to formal serve for several times, but till March 28, 1996, this promise finally realized. They adjust the operation schedule for many times, here is the summary table for their correction.

	Date	Reasons
Original date	1991/12/13	
1 <sup>st</sup> revised date	1992/09/30	design change, hard to get land
2 <sup>nd</sup> revised date	1992/12/31	difficult to find the good contractor short of labor, difficult to move the existed building
3 <sup>rd</sup> revised date	1993/08/02	material waiting, contractor ability insufficient
4 <sup>th</sup> revised date	1994/02	two times fire accident
5 <sup>th</sup> revised date	1994/08/02	the causes of fire accident were not clear, government did not allow MATRA keep on testing
Formal operation date 1996/03/28		

### 5. Model verification and renew

#### 5.1 The verification of Ross & Staw's model

In this case, we find two factors, which are labeled as project determinants, “goal value evaluation”, “redundancy value and closing cost”. The “goal value evaluation” factor is the major reason to adopt medium capacity system in the Mucha Line planning phase, it also influence the decision, whether keeping on construction or withdraw.

For the psychological determinants, we also find two factors in the category. The major decision maker's psychological factors are “self-justification” and “information processing”. Most of the decision makers would be influenced by these two factors, and made them behave like denied mistakes, insistent their opinion, doing small change when they dealing with the capacity and cleft problems.

For the social determinants, we find “face-saving” and “external binding” two factors. It means decision makers would try to show their performance and contributions, which could justify their capability. Especially under social situational pressure, they would repeat their promise and emphasis their determination to keep the consistency of behavior and self-concept.

For the structural determinants, we find the “structural inertia” and “economic and technical side effect” two factors, which match the data. It means that the Executive Yuan, Taipei City Government, Taipei City Council, all three parties used their political power to interfere in the planning and building processes. Also, we find the Taipei City Government had ignoring problems, refuse to change, and binding to wrong regulations these syndromes. Recently, the Department of Rapid Transit Systems consider the economic and technical effect and could still choose the MATRA's medium-capacity systems for the extension of Mucha Line.

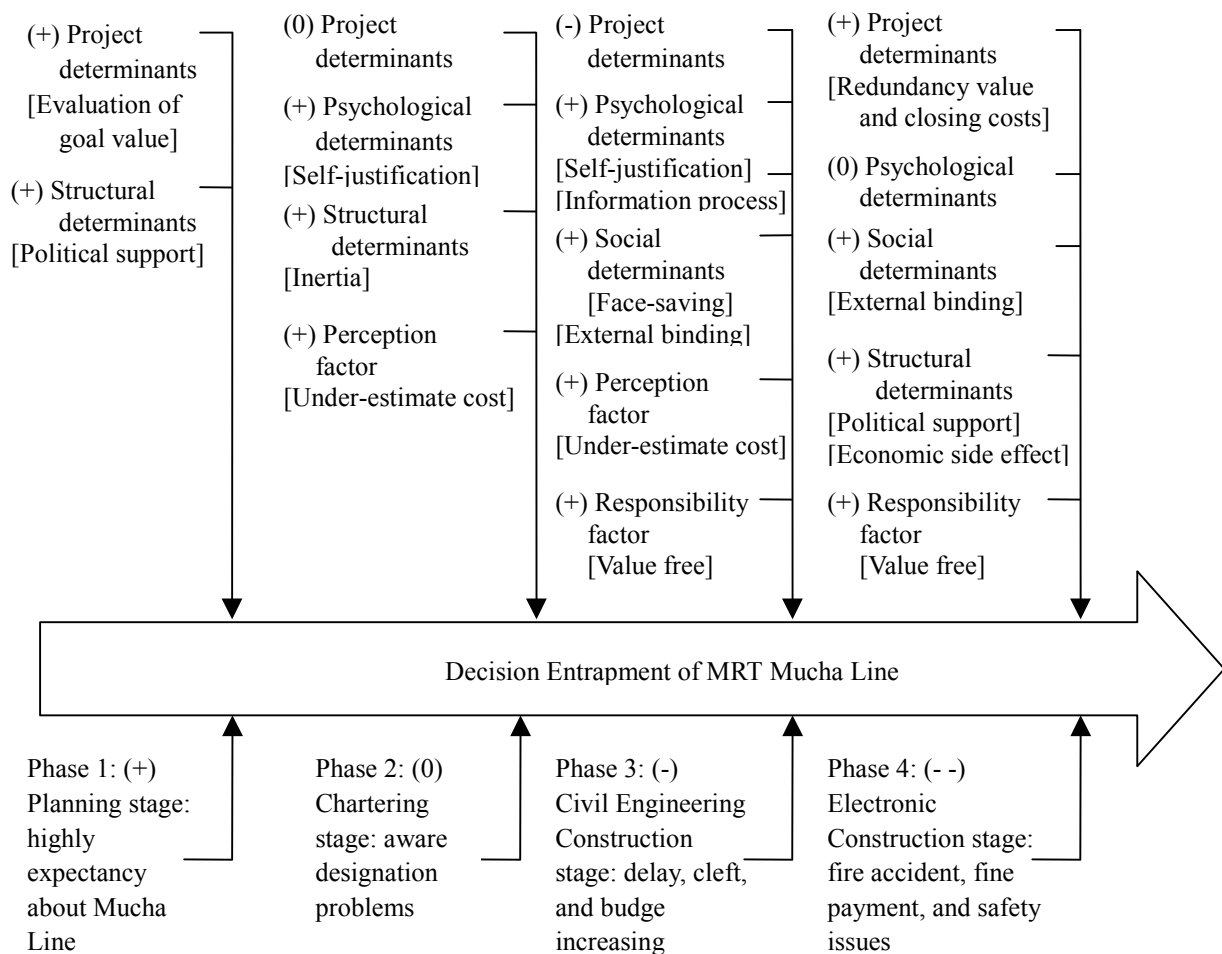
Beside these four determinants of Ross & Staw's model, we also verify two other factors. One of them is responsibility factor. According the Staw & Ross (1981), they argued high responsibility people have intention to keep on this entrapment behavior, but low responsibility people will try to retreat from the situation. In this case, we find a different story. When the new mayor, Chen, Shui-Bian, had to make decision whether to continue or not, he seemed not very eager to stop the program. Actually, he said he is free to accept two side opinions, and he organized a reviewing committee to help him. From the data, the new mayor seemed not felt the obligation to justify previous action, also he seemed like to make this program work, try to turn the whole thing around, then he can take the success credits.

The other factor we find is “perception distortion”. It is a common phenomenon for all the decision makers in this case. It seemed they usually under estimated the cost of building, and over expect the effectiveness of result.

#### 5.2 Discussion and conclusion

The findings we draw from Mucha Line case mostly match the Staw's model predictions. Project determinants have positive effect on entrapment behavior in the planning phase, negative effect on civil engineering construction phase, electronic construction phase and operation phase; psychological determinants have positive effect on chartering phase and civil engineering construction phase; social determinants have positive effect on civil engineering

construction phase ‘electronic construction phase and operation phase; structural determinants have positive effect on planning phase, chartering phase, electronic construction phase and operation phase; responsibility factor has positive effect on electronic construction phase and operation phase; perception distortion has positive effect on chartering phase and civil engineering construction phase. All these effect can be seen more specific in figure 2.



**Fig. 2 Determinants of entrapment behavior in MRT Mucha Line construction process**

Finally, we draw four propositions from the results. 1.If political factor affect the decision process too early, it will cause more resources waste and make withdraw more difficult. 2.In the structural determinant, professional technology and knowledge should be added into it. And if these two factors affect the entrapment process in the early stage and are not replaceable, then it will make entrapment behavior more serious. 3. When decision-maker does not have to be responsible for the failure choice, and his character are face-saving, dominant leadership style, then he will justify the choice and his behavior. The entrapment behavior will last. 4. When the organization involves the entrapment process, it also has the technical and knowledge superior perception then the organization will tend to ignore the negative information. And the entrapment process will keep going on.

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