

Strategic Choice, Managerial Cognition and the Forming & Breaking of Path Dependence: A Combined Perspective of Action and Cognition

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Abstract

Path dependence involves many factors at different levels. However, there lacks still a comprehensive perspectives to link both micro level dynamic change and related macro organizational evolution. By distinguishing the types of path dependence into action level and cognition level, this paper illustrates the forming of path dependence from the perspectives of strategic choice and managerial cognition, which has an interactive influence to reinforce path dependence. The case of TKS offers valuable inspirations for the forming and breaking of path dependence, illustrates further the interactive role of managerial cognition and strategic choice in forming and breaking path dependence. In rapid changing nonlinear environment, it will be really a challenge to explore the micro dynamic and the evolution of organization structure and function at macro level. A combined perspective of cognition and action could be a possible choice for the related research.

Key words: Strategic choice; Cognitive freezing; Path dependence

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INTRODUCTION

Though the thinking of “changing” has been widely accepted in complex environment, the existence of cognition freezing and its influence on strategic action hasn't been noticed well. Most of researches on path dependence and breaking give more emphasis on external factors, such as institutional, technological change, lacking an inner perspective to the forming and evolution of path dependence. In fact, the forming and evolution of path dependence in organization is a complex process involving multi-dimensions and multi-factors, with close link between the result of action of actors in organization and the cognition of actors. Though research on managerial cognition has been explored in the past two decades and some researchers even advocated that research and application of “cognition” would be an effective way to successful management in the 21st Century, researches on managerial cognition are still scattered in organizational strategy research domains. A dynamic systematic analytic perspective, by which the link between inner micro change and external macro evolution could be built, is still lacking. In face of the increasing tendency of management issues to be interdisciplinary, complex, some scholars urged the necessity to make an integrated research on cognition, entrepreneurship and strategic management. As a response to this proposal, this article tries to disclose the interaction of micro dynamics in organization with macro evolution of organization by illustrating the forming and breaking of path dependence through integrating the perspectives of managerial cognition and strategic action. Such an integrated perspective indicates us to pay attention to the shadow of managerial cognition

and meanwhile the necessity of changing cognition in breaking path dependence.

1. LITERATURE REVIEW

1.1 Strategic Choice and Path Dependence

Research from Gavetti & Rivkin (2007) has pointed that there are two basic thinking in terms of the origin of strategy. One is the so called “position” school, with complete cognitive capability manager could position and design strategy for organization. The other one is the evolutionary school, emphasizing on management learning within bounded rationality and decision-making are always made by managers under a certain cognitive limitation. In our opinion, this kind of differentiation on strategy involves finally on the debate about the management intention. This issue could be understood as whether strategic choice is a path-dependent evolution process or is a path creating process designed and achieved intentionally by manager. Scholars in strategic choice hold the view that firm’s strategy is the outcome of subjective decisions. That means, top managers could change deliberately the trajectory for firm’s development and even get opportunity to reshape the environment which firm embedded in (Child, 1972). In contrast to this, David (1990) concluded the path dependent character of strategy process: past decision forms set for possible strategies in future. In the following, we will illustrate the nature of path dependence of strategic choice by exploring related thoughts in the field of strategic management.

Path dependence in RBV

Despite the fact that there has not a unified definition to the “resource” expressed in the idea of RBV, and recently more other viewpoints on firm have been emerging, such as core capability, dynamic capability, knowledge view and relation view etc, RBV still plays important influence to scholars in the field of organization and management. However, we shouldn’t ignore the “risks” of path dependence entailed in RBV. In essence, RBV contains the genetic code in organization. In his article for celebrating the tenth anniversary of RBV Barney(2001)has pointed out that there has no any differentiation between routine and resource (capability). Considering the important characteristics of resource including inimitability, non-substitution, resources in organization could actually form assets that are hard to be transactional. Therefore, some resources and capabilities could be developed only after long-term accumulation. And that is a process of path dependence.

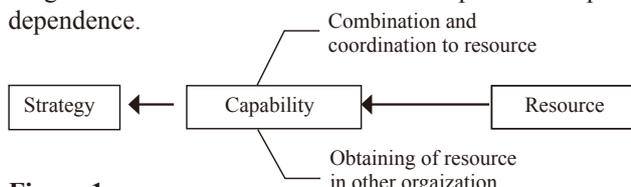


Figure 1
An RBV View on the Forming of Strategy

From the point of RBV, the overstress to resource and core capability could form routines in organization, causing the simplification of organizational strategy, lacking the strategic response to external environment, leading to path dependence in making strategy in organization. And finally that could cause a “sclerosis” of organization. Some research on the recession of old industrial region have disclosed it is because of path dependence caused from institutional rigidity that making those regions to be the victim of past success (Todtling & Trippel, 2004). In the fast-changing environment, what necessary for organization is its capability on breaking path dependence and achieving new path creation.

Path dependence in evolution school

Strategy should be a kind of mindful deviation to the status quo. However, during the implementation of strategy, it could possibly be influenced by past routines and become path dependence. Because today’s routine are associated with learning routine and knowledge at yesterday (Maskell & Malmberg, 2007).

Many scholars in evolution school believe that firm is a product of history and is constrained by the conditions at the foundation stage. Teece *et al* (1997) indicated that a firm’s previous investment and it’s repertoire of routines could restrain it’s behaviour in future and it is hard to escape from it’s history. So, the evolution of enterprise happens by following a specific path. From the viewpoint of evolution, path dependence is a necessary condition for accumulating resource and survival. (Hannan & Freeman, 1989) pointed also that inertia is necessary for established firms in order to improve their survival opportunities.

Thus, path dependence could be understood as an outcome of evolutionary myopia (Levinthal & March, 1993). Early research from Mintzberg (1978) pointed also, strategic behavior is path dependent, i.e, the own history of the process could create specific trajectory, and which in turn could make limitation to strategic decision making. That fits perfectly to the idea of path dependence, depending not only on the context but also on its own history.

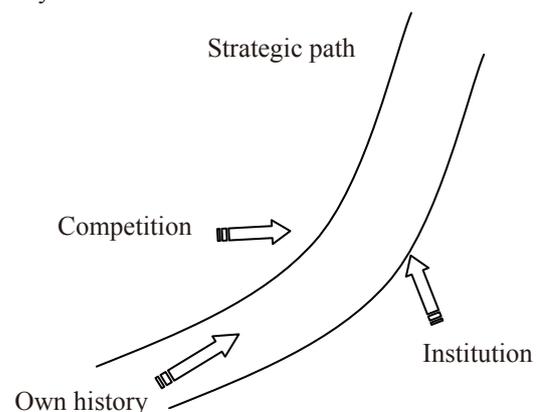


Figure 2
Forming of Strategic Path Dependence

Thus, path dependence in strategy could be regarded as a trend that a firm continues to do the same thing either because of its capability or knowledge on finishing a specific task or because of it could not escape from its own history (Winter, 2006).

Path dependence in decision-making school

Carnegie School holds on the cognitive limitation of individual decision-maker. So rule-based decision-making guides the action and it is hard to change the track of decision-making. As routine adaption system, organization has the characteristic of following rules. Because of the cognitive limitation, strategic decision-making would tend to form path dependence. "stay in the current path or find a new path" would depend more on organization members' feeling rather than their willingness (Lamberg & Tikkanen, 2006).

Researches on cognition psychology, especially the knowledge about human's behaviour on making judgement and decision-making under uncertain environment broaden our understanding to human behaviour. Tversky & Kahneman (1974) validated the existence of 'cognition oddity' through experiment. They indicated that human could apply systematically suboptimal or even simplified or limited rational model with mistake result. Limited rationality could making individual's search activities focusing on potential selection within limited scope (March, 1991; Ocasio, 1997). Local exploitation, i.e. searching answers which are similar to existing solution by means of existing routines is still preferred.

1.2 Managerial Cognition and Path Dependence

In recent years, research on strategy is tending to explore the micro foundation for the forming of strategy. Research on organizational cognition is becoming a new method to solve series important questions in organization research and also an important bridge to gap different fields in management science (Huff, 1997). In his research on the development of digital control machine in U.S and Japan, Mazzoleni (1997) pointed out that it is customers' different perceptions to technology that influenced strategic selection as well as their different industrial development path. The forming of path dependence has something to do with cognition bias and cognitive inertia to a large extent. Heffernan (2003) suggested also making research on path dependence from a micro perspective of cognition. Some scholars have began to make research on the development and implementation process of industrial and market competition strategy from the perspective of cognitive inertia (Calori, 1997; Hodgkinson, 1997; Reger & Huff, 1998). In his research on real estate agency in England, Hodgkinson (1997) pointed, once firms formed cognitive inertia, actors would depend on their thinking model overly that ignored the external change, even environmental change has become very obvious and wide, organization's capability on making adaptive adjustment suffered serious destroy. Cognition inertia means that

once firm traps into a degressive trend, because strategic decision maker could not adjust their thinking model in order to cope with changed environment, the firm could possibly last this situation. Kiesler & Sproull (1982) pointed out that the key factors for management behaviour in rapid changing environment are sensitivity to problems, cognition to environment change and actions of organization. In their research on the relationship between cognition change, strategic action and organizational regeneration, Barr (1992) recognized that managers at top level in organization should keep pace with the change of external environment. Because of inertia on thinking model, managers could neglect important change in environment that no actions have been taken in organization, causing spiral degeneration of organization and leading to a road of organizational recession (Barr, Stimpert and Huff, 1992). Rizzello (1997) disclosed further the mechanism of path dependence from the perspective of human psychological cognition. Previous established thinking model is made as evaluation tool for further selection. Based on these criteria, responsive to external environment select only those signals similar to existed thinking model. Thus, the action model of actors would be further limited (Rizzello, 1997).

According to related researches from cognition and decision-making, the obtainability of searching mechanism depends to a great extent on the ambiguity of information environment in which organization is embedded. As an industry has achieved a high level of maturity, amounts of information have been accumulated in industry, which helped remove technological and competitive uncertainty (Klepper & Graddy, 1990). The accumulated information in industry include regulations, frameworks, expectations as well as related organizational practice and routines, which brings organization with order and stability. Thus, as industry evolves to higher level maturity organizations within the industry will enjoy less ambiguity of information environment and be adaptive to local search. In this case, cognitive inertia or freezing resulting from local search would become the source for the situation of path dependence for the industry and organizations in this industry.

Research from psychology has disclosed the relationship between thinking model and behaviour. Because of limitation of cognition, when in face of complex decision-making, thinking model would take a selective way to explain information, often with more familiar information and behaviour. The presented action would follow past routines. Research on organizational learning validates also the existence of single loop thinking in managerial cognition (Argyris, 1996). Fiske & Taylor (1991) pointed out the stickiness character of thinking model and cognition. When facing new environmental stimulus, people tend to take and repeat those thinking model which have been used before in other context (Fiske & Taylor, 1991). A persistent hold

thinking model plays just like a lens in thinking process, making individual's attention focus on "what he could see" and "what he wants to see", with a diverge to the true and comprehensive situation. Cognitively, such a thinking model with lasting focus on some specific local parts belongs to a kind of deviation of cognitive anchoring (North & Denzau, 1994).

Cognition freezing could be tracked back to two reasons. On one aspect, the asymmetry of information or information cost could cause inertia, resulting to cognitive freezing; on another aspect, successful experiences in the past cause blind confidence, leading to cognitive freezing. Miller & Chen (1994) has an excellent illustration to this situation. He regarded organization as an inertia system, among which, managers tend to continue "to do best what they have done before". Research from Lewin & Volberda (1999) doubted also the managerial intentionality. Because of individual's limited rationality, search activities by individuals focus only on potential alternatives, local search (March, 1991; Ocasio, 1997). The consequence of local search is presented often as a self-regulation feedback, making individual actors less sensitive to changing environment, forming cognitive freezing. When the degree of cognitive freezing reaches a certain threshold value, managers could even "navigate in new ocean by using old maps" (Reger & Palmer, 1996). Ultimately, the freezing thinking model individual's actions would be restrained to a specific path dependent action maps.

2. STRATEGIC CHOICE, MANAGERIAL COGNITION AND THE EVOLUTION OF PATH DEPENDENCE

Due to the limitation of rationality, under complex and uncertain environment, management's cognition and response to environment is implemented under the lens of thinking model (Weick, 1979). For example, management could make decision-making rapidly in an environment with high velocity changing by taking a "selective attention" to those phenomenon and things which they have been being familiar with (Eisenhardt, 1989). Research from Mackay (2006) verified the reason for the decline of Scotland's jute industry development lies in the failed strategy selection and path dependence resulting from cognitive freezing in senior managers (Mackay, Masrani and Mckiernan, 2006). Path dependence induced from cognitive freezing could be presented at organizational level, impacting on the selection of organizational strategy. From a perspective of organizational learning, the caused freezing in managerial cognition belongs to a pattern of looking backward learning (Gavetti & Levinthal, 2000), being incapable of coping with proactive issues. Therefore, once managerial cognition was formed in the minds of decision-makers, it tends to form a set of

strategic selection based on experiences and local search dominated backward looking learning. In this set, some of those optional strategic selections were based on routines and experiences, which would influence actor's strategic selection, resulting tendency of path dependence.

Essentially, strategy should be a kind of mindful deviation to status quo grounded on prediction to future development. However, the implementation of strategy could suffer the risk of being limited from past routines. Routine has been regarded as a core element in organizational action. The operation of routine is dependent on local search which could cause a pattern of localized learning, inducing further space myopia (Maskell & Malmberg, 2007), searching homogenous paths in local scope (Levitt & March, 1988). Thus, over dependence on local exploitative learning made the searching mechanism being locked-in past path, destroying organization's ability to perceive and make response to external changes (Cohen & Levinthal, 1990).

Therefore, managerial cognition and strategic selection could be understood as an interactive iteration relationship. Under the influence of managerial selective attention, managerial strategic selection would be limited on the path of resource dependence. The self-feedback mechanism reinforced original cognition, which could cause the formation of managerial freezing and have a lasting influence on strategic selection. Constrained by the sunk cost, organization would be locked-in previous path, reinforced organizational routines. Under the influence of networking effect, path dependence of organization is strengthened. So, the process of strategic selection includes the path dependence of managerial cognition, while cognitive freezing reinforces the path dependence of strategic action. The iteration relationship between managerial cognition and strategic selection is illustrated in Figure 3.

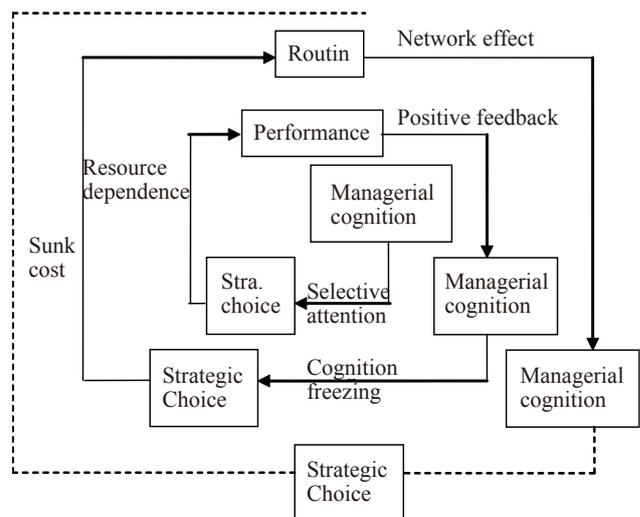


Figure 3
Iteration of Managerial Cognition, Strategic Choice and the Induced Path Dependence

Generally, the relationship among managerial cognition, strategic selection and path dependence could be depicted as figure 4.

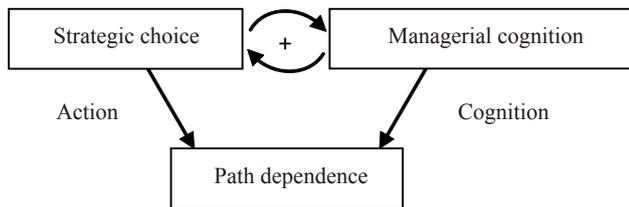


Figure 4
A Framework among Strategic Choice, Managerial Cognition and Path Dependence

In fact, there are some scholars they have examined the limitation of managerial cognition. Pernose(1956) has pointed out that entrepreneur's cognitive resources would limit enterprise's searching space. Therefore, actor's cognitive capability, i.e., his attention to searching contents (the valuable things enterprise should do) determines the degree of organization innovation and evolution. Suppose the actor's attention rule is the focus on routines, the searching space of organization would become less and less till to the formation of path dependence; on the contrary, if the actor's attention rule is the focus on innovation, new innovative spaces would be created and explored. Apart from this, in the view of organizational learning, actor's strategic selection actually represents his rule of searching. About this point, March (1991) has indicated that myopia learning could form a trap for organization. So, the rule of searching, i.e., the pattern of search, how to search, would have an influence on the innovativeness of organizational actions.

In a word, organizational path dependence is not a static phenomena but a dynamic continuous evolving process. Some scholars have turned their insights from the analysis of path dependence to the study of path breaking and creation. Although related researches on breaking path dependence is still lacking, the research from Garud and Kano(2001) indicated without doubt a direction, i.e., to explore the enabling power of actors at micro level, such as entrepreneurs, in breaking path dependence and achieving path creation.

3. CASE-PATH DEPENDENCE AND PATH BREAKING IN THE DEVELOPMENT OF TKS

Currently, the debate on the restructuring and reinvention of Ruhr Region in Germany still floods in many researches. Here, we are not intending to discuss the success or unsuccessfulness of this region. But, considering the old-reputationed corporation in this region, ThyssenKrupp Steel (TKS) has been experiencing a successful transition in the recent decade. we do believe

the case of TKS could be a good example to illustrate the dynamic process of path dependence and path breaking.

Thyssen and Krupp both were historical steel companies in Ruhr Region. In 1950's economic booming, both companies were regarded as the two heroes of Germany. In late 1960s, because of the new emerging markets as well as less competitive strategy, both companies experienced dramatic decrease. It was not until 1990s, after the two companies were merged to TKS, it could renew itself. Nowadays, TKS has developed itself as the largest manufacturer on many high quality steel products. It leads the stainless steel products of world markets, has world-class capabilities on quality steel products, such as premium flat carbon steel.

During the oil crisis and consequent steel crisis in 1970s, many European countries adopted supportive policies including huge government subsidies under pressures from unions to save home country's steel industry. This made people to be ambiguous about the reality, mixing difficulties at present with tendency of change in long-term, causing cognitive freezing which restricted possible strategic actions to overcome the dilemmas. In this situation, local region was locked further in steel industry. The slow process of closing steel manufacturing facilities of Thyssen is an example. It took nearly 30 years for Thyssen to close its last steel firm in the Ruhr Region.

During the period of late 1970s to middle 1980s, steel industry suffered serious recession. In front of this hard situation, the largest two steel manufacturers in Ruhr Region had to diversify their businesses. In 1980s, Thyssen began enter into a stage of vertical diversification, exploring some fields with potential market value, such as automobile, industry engineering, etc. Apart from this, these companies realized that sustained development of industry relied on satisfying emerging market demands instead of on booming markets. The oil crisis put forward new demand to auto manufacturers with lighter, stronger and safer materials for auto. Thyssen took this opportunity to expand its business space. Auto industry sector was set up within steel manufacturing department, focusing on providing type-in-tailored models, components for auto manufacturers. From 1985, Thyssen has begun its transition from steel manufacturer to systematic integration, from providing commodities to high value-added service provider.

In 1990s, in the wave of the warming steel market, steel industry in Ruhr Region was improved further. Production capacity was controlled within a certain level; environment protection, technological improvement and products and technique innovation were put in agenda of firms. In late 1990s, Thyssen and Krupp were merged and reorganized to be TKS. This created a new path for the development of TKS through reducing cost, increasing production capacity, improving competitiveness, focusing on R&D and production of high-value added products

as well as products with significant potential increasing. Today, TKS is the unique systematic provider focusing on qualified steel products segment around the world. The high-value added products has 80% of its carbon steel production and 90% of its stainless steel production.

The process of path dependence and path creation in TKS is illustrated as table 1.

Table 1 strategic choice, managerial cognition and the forming & breaking of path dependence in Table 1:

Table 1
The Process of Path Dependence and Path Creation in TKS

	1954-1974	1974 – 1989	1990 – 1997	1997 – 2001	2002 –
Industry background	Big companies dominated; large-scale production; over-capacity of production; convergence of technology	Market recession; Over-capacity; Laid-off employees	Seeking cooperation among firms	Industry reorganization and shuffle	Booming market; global competition; production and technique innovation; sustainable development
Milestone events	Reproduction of steel in 1954 Historical record of steel production in 1974	Steel crisis Close of steel manufacturing facilities in Rheinhausen	Continuous negotiations and reorganization among firms	Thyssen and Krupp were merged to be TKS in 1997	Investment in Brazil, U.S. Collaboration with JTE
Strategic choice	Reinforcing resource advantages	Lacking of strategy	Achieving heterogeneous resources	Strategic reorganization	Global strategy; Value chain adding strategy
Managerial cognition	Selective attention	Managerial freezing	Mindful deviation	Cognition transition	Openness
Learning and searching	Backward looking; routine and myopia searching	Experience learning	Collaboration learning	Organization cohesion; collaboration learning	Forward looking; Adaptation and global searching
Path evolution	Path convergence	Path dependence	Breaking path dependence	Reorientation of path	Path creation

As the story of TKS disclosed, TKS has experienced the process from forming path dependence to breaking path dependence to creating new path. The transition and creation of path could be represented as the following processes: from the mode of increasing production to focusing on technology and production innovation; from pure steel products provider to be system partner of customers by providing whole and type-in-tailored solutions; from Europe positioned to positive involvement in global competition. In the whole process, we could find that each transition and creation is achieved through adjusting managerial cognition and strategic choice.

Through expanding the attention of managerial cognition, TKS explored product segment with clear understanding of its products. In this transition, TKS provides type-in-tailored products for auto manufacturers, sets up delivery center, offers service with professional data set, achieving the transition from raw material manufacturing to professional and diversified servicing. Apart from the transition, TKS expanded also its businesses in wider area through changing searching mechanism of strategic choice. Through collaboration, alliance, outsourcing, TKS could form partnership with downstream customers (such as auto manufacturers), penetrating into upstream supplier of raw materials, forming its map of production and marketing in global area. In general, the change of rules for actors' cognition

and action is prerequisite for breaking path dependence and path creation.

CONCLUSION

Through combining perspectives from strategy decision making, managerial cognition and path dependence, this paper contributes to our understanding on path dependence and strategic management.

The formation and evolution of path dependence in organization is restrained from strategic selection of actor on the one hand and actor's managerial cognition on the other hand. The two aspects could form an iteration process. Under the impact of positive feedback in this iteration process, actor could present a limited searching scope, with more local learning in their actions; while their cognition could be reinforced to present cognition freezing, which restrain actor's action further.

The experience of Ruhr Region in breaking path dependence indicates us that it is crucial in future research to explore the appropriate timing to take measures to achieving the breaking and transition of path dependence. This is still a challenge for research on path dependence as well as related issues in the field of strategic management such as technological innovation.

In rapidly changing and complex environment, the possibility of making strategy decision making is more

impacted from decision-maker's individual cognition level. Scholars even believe that organization in complex environment must force itself 'unlearn' past successful experiences (Sinkula, 2002). Other scholars suggested that modern strategy making should turn to interactive and emerging way, i.e., strategy is not formed by an individual, but emerged from interactive process among actors, artificial intelligence, rules and routines. Therefore, future research should shed more lights on exploring the interactions between micro cognition at individual level and macro strategic change at organizational level.

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