Organizational forgetting, absorptive capacity, and innovation performance: A moderated mediation analysis

Abstract

1. Introduction

In order to get rid of the fetter of the old technology and technology lock-in, the enterprises have to forget outdated knowledge and abandon the established thoughts and core rigidity. Organizational forgetting is a way for an enterprise to discard its obsolete knowledge and call into question its pre-established beliefs in order to adapt to various environmental changes (Anand *et al*., 1998). It can abandon some of the existing organizational inertia, and provide new cognitive space for innovation and, therefore, generate new knowledge in the organization to be recognized and nurtured, and, subsequently, inspire innovation. The complexity of the external environment causes a business, which does not forget outdated practices, to lose dynamism needed to remain vibrant and competitive. As an example, Kodak was bankrupt, partially because of sticking to the perception of its superiority in the conventional photo making industry at a time when the digital technology was developing and undergoing maturity day by day. It seems well accepted that, organizational forgetting may lead to the ability of an enterprise to innovate and may even directly impact the firm's survival. However, most existing literatures about organizational forgetting are limited to theoretical discussion, much of the work has focused on the description or conceptual model rather than the impact of organizational forgetting on enterprise management and innovation. A reasonable theoretical framework and more empirical tests in needed to provide evidence.

Literature also shows that changing attitudes and conventions does not always lead to the successful development of new products because organizational forgetting process takes up time and consumes limited resources. It is noted that the change in the values or project routines without careful assessment may weaken the team's development ability (Akgun *et al*., 2006). In fact, changes in values and conventions will not have any impact on organizational operation and organizational performance, unless such changes are really applied. If the organization lacks the necessary skills, intentional organizational forgetting is incomplete and will result in ineffective functioning of the team. In this sense, the organizational forgetting does not necessarily lead to successful development, the development team also needs the ability to actually apply this change into the project development process. However, existing literature does not give a clear explanation for this ability.

Organizational knowledge-base is adjusted by devaluation of knowledge (forgetting) and adding new knowledge (absorption) to achieve a new dynamic balance. Hence, it is necessary and an extension of natural logic to construct an analysis based on such interactive process in order to answer the intrinsic mechanism of organizational forgetting on innovation. Absorption capacity is considered to include identifying, assimilating, and integrating new knowledge; it is a dynamic process capability. Organizational forgetting has an impact on knowledge cognition, conversion and integration approach in the process of innovation. Therefore, this study believes that absorptive capacity may be the important explanatory variables with respect to organizational forgetting and innovation. Although prior researches have mentioned that organizational forgetting may correlate with absorptive capacity (Gabriel *et al*.,2012; Jin *et al*.,2009), there is practically no empirical evidence in this regard.

In addition, environmental contingency theory suggests that influence of environmental contexts should be considered to enhance the predictive powers of research (Barney *et al*. 2011). This study draws on environmental turbulence as an adjustment factor within the analysis framework because a

firm's innovative processes are embedded in its environmental context (Jansen *et al*.,2006; Lichtenthaler,2009). The environment is the situational constraints and chances that influence the relationship between the relevant factors (Johns,2006). Although most studies noted the importance of organizational forgetting, the context in which the organizational forgetting may contribute to the continuing development of innovations still needs further investigation. Hence, accounting for environmental context in this study may provide a clearer understanding of the boundaries on the way organizational forgetting contributes to a firm's innovation performance.

This paper aims to fill these gaps by empirically testing a conceptual model that includes organizational forgetting, absorptive capacity, innovation performance, and environmental turbulence, and by examining the moderated mediation between the variables. This study contributes to the literature on organizational forgetting by clarifying the boundary conditions under which organizational forgetting enhances innovation performance. Contrasting with previous research, our research demonstrates that the effect of organizational forgetting is not constantly positive but instead increases with the level of environmental turbulence. This study not only enriches the existing research that has been conducted outside of the Chinese organizations' context but also may help to make insightful suggestions for new research toward a more comprehensive theory regarding the organizational forgetting and its relationship with innovation.

The paper is organized as follows: Section 2 describes the theory and hypothesis utilized in our research. Section 3 describes the samples and measures. In Section 4, we discuss the empirical results. In Section 5, we provide a discussion that summarizes our findings and suggests potential future research directions.

2. Literature review and hypotheses development

2.1 The influence of organizational forgetting on enterprise innovation performance.

Organizational forgetting has been studied mainly in two academic streams: one is to study the forgotten behavior caused by unexpected factors leading to the reduction of knowledge stock (Benkard,2000;Smunt and Morton,1985; Beckman and Epple ,1990 ; Darr, Argote and Epple,1995; Epple, Argote and Murphy,1996; Carmona and Grönlund,1998). Scholars generally believe that the new acquisition or creation of knowledge would be unintentionally lost before they become organizational memory. The main reason is the natural loss of knowledge transfer and circulation in the organization or the elimination of the old knowledge and skills caused by changes in the organizational life cycle. By contrast, the other is to study an organization's intentionally forgotten behavior. This branch views intentional forgetting as a preliminary step toward organizational learning and a necessary process for the management of change (Starbuck, 1996; Akgün *et al*., 2007). It is generally believed that certain routines, values, policies and strategies will hinder the organization to acquire and absorb new knowledge, thus, organizational learning can't happen if there is no organizational forgetting (Lei, Slocum and Pitts, 1999). Consistent with the mainstream research, we mainly focus on organizations' intentionally forgotten behavior.

Nonaka and Takeuchi (1995) suggest that organizational forgetting is a process of relearning, in which new knowledge structures replace old knowledge structures. Cegarra and Dewhurst (2006) describe that organizational forgetting is the process of eliminating old logic and providing space for new logic. Tsang and Zahra (2008) believe that organizational forgetting is the process of discarding old practices and establishing new specifications. Finally, Gabriel *et al* (2010) think that organizational forgetting is the process of reorientation of the organization's values, norms and behaviors through the change of the cognitive structure, the mental model, the dominant logic and the core idea in

organization. In this paper, organizational forgetting is defined as abandoning outdated routines, norms, beliefs, procedures, policies, values and methods, while acquiring and assimilating new suitable ones, to adapt to the changing environment. In this context, organizational forgetting is seen as one of the principal obstacles to innovation, which need to abandon obsolete mental models, and to create a continuous innovation capacity in organizations.

The relationship between organizational forgetting and innovation has been examined by various researchers, concluding that "forgetting is a key factor of innovation". In this regard, organizational forgetting was the driving force for innovation (Benkard, 2000; Pan and Yu,2009), because it can promote innovation by improving organizational reactivity and adaptability to the environment (Holan *et al*.,2004; Chen and Jin,2006), and the more organizational forgetting, the stronger the innovation performance (Mieres *et al*. 2012). Organizational forgetting, allows to acquire new information and behaviors, as well as being a mechanism which can promote corporate change and innovation which is the main reason for encouraging and committing to organizational forgetting (Becker, 2008). Thus, it is significantly essential to recognize within the innovation processes the knowledge or beliefs that are no longer optimal in the process of innovation (Hamel and Prahalad, 1994; Nystrom and Starbuck, 1984).

The literature also warns that some so-called defensive routines will inhibit organizational forgetting (Akgün *et al*., 2006, 2007;Gieskes and Hyland, 2003). Due to some widely-accepted concepts and methods organizations often ignore the important technology and market changes because people usually have strong feelings about the old ways of working (Mezias *et al*. 2001). Enterprises have already formed the organizational inertia in its long-term development process, including the relatively mature cognitive structure, cognitive concept, modeling cognitive behavior and institutional norms and practices; which tend to limit the organizational innovation behavior and seriously affect the innovation performance. The changes of environment wane the adaptability of the existing core competency and other elements. At the same time, organizational success would amplify the roles of these elements, breed complacency and closed mindset, virtually shield all external and contradictory views and information leading to core competency rigidity or competency trap within organization, becoming a hidden obstacle to organizational development (Leonard, 1995; Levitt and March,1988). It is precisely the existence of this inertia which again makes organizational forgetting a key element in innovation.

On the one hand, organizational forgetting can break the locked state, relieve the shackle of thinking and form new awareness by abandoning the existing organizational cognitive structure. On the other hand, an organization can enhance its innovation performance by avoiding bad habits from outside and identifying and introducing new knowledge. It should be emphasized that the adjustment and modification of the original organizational practices and knowledge often promote the incremental innovation in organizations. Conversely, the creation of new knowledge and practices may lead to breakthrough innovation for organizations. Based on the above analysis, we put forth the following hypothesis:

Hypothesis 1. Organizational forgetting has a significant, positive influence on innovation performance.

2.2 The mediating effect of absorptive capacity

Absorptive capacity refers to a dynamic capability formed by a set of organizational routines and processes of external knowledge acquisition and assimilation (potential absorptive capacity) as well as knowledge transformation and application (realized absorptive) (Harrington and Guimaraes, 2005; Newey and Zahra, 2009; Zahra and George, 2002). Potential Absorptive capacity represents the

knowledge seeking capabilities of enterprise development, but may or may not be used for innovation, realized absorptive capacity represents the ability to develop products and services.

Weick (1993) holds that new knowledge can not be trained in the organization if there is no space for it. Drawing on the studies of Rogers (2003), the starting point of knowledge transfer is the process of search. During this stage, the recipients of knowledge firstly need to identify and assess the knowledge of provider. However, the original cognitive filtering mechanisms and reference systems tend to influence the identification and assessment of the recipients because of the overlooking of losing the absorption power trap resulting from inability to recognize or understand the potential value of new external knowledge (Bettis and Prahalad,1995). With the investment of enterprises, organizations are more inclined to rely on the existing system and the ways of development and are unwilling to change due to organizational inertia and impact of switching costs. Thus, when the existing knowledge is not compatible with or conflicts with new knowledge, the strict rigid cognitive system based on the past experience and background will result in rejection and filtering to the new knowledge (Yildiz and Fey, 2010), which causes organizations to refuse to accept and establish new methods and strategies of knowledge. Therefore, it is essential for an internal context that promotes the replacement of outdated knowledge if firms plan to create and apply new knowledge structures.

Organizational forgetting is to reshape organizational values or behaviors by changing beliefs, norms, values, procedures and routines, the mental models (Day and Nedungadi, 1994), cognitive structures (Nystrom and Starbuck, 1984), dominant logics (Bettis and Prahalad, 1995) and core assumptions which guide behavior (Shaw and Perkins, 1991) to attain a competitive advantage. Thus, the organizational forgetting is not only a mechanism for forgetting outdated knowledge, but also the way in which firms are able to develop and make space for new knowledge. The effect of it, is associated with its ability to prepare the ground for absorptive capacity. Absorptive capacity cannot be produced spontaneously, only by breaking the original knowledge system and eliminating outdated or incorrect knowledge can organizations make space to store and absorb new knowledge (Cohen and Levinthal,1990). Forgetting is a required process to erase certain routines and rules before new organizational knowledge can be acquired and assimilated (Lei, Slocum and Pitts, 1999). Therefore, the organizational forgetting provides a nurturing space for the generation and cultivation of absorption capacity through reconstruction of organizational knowledge system. Organizational forgetting also promotes cultivation of absorptive capacity. Specifically, potential absorptive capacity linked to external knowledge acquisition and assimilation. Whereas acquisition includes the processes of identifying and acquiring new external knowledge, assimilation refers to analyze process, interpret and understand the information obtained from external. In this regard, since organizational forgetting is the process of filtering and eliminating the original knowledge structure, this requires organization to identify values and applicability of knowledge according to it's strategic objective and environment before new knowledge enters the organization, in order not to dampen the competitiveness of the organization. Hence, organizational forgetting plays a crucial role when newly acquired knowledge is incompatible with current organizational knowledge. Realized absorptive capacity results from processes of transformation and application. Transformation refers to the ability to understand and interpret external knowledge and integrate them into the existing repository. Application refers to the ability to extend and regroup acquired and transformed knowledge into their operations. In this regards, organizational forgetting will promote understanding of external acquired knowledge and eventually facilitate transformation through the change of provincial thinking. And through the well-directed forgetting it is possible to isolate the useful information can make the process of application more

smooth. Therefore, organizational forgetting is conducive to the generation and cultivation of absorptive capacity.

Absorptive capacity is an important factor to help enterprises achieve organizational performance (Fosfuri *et al*., 2008). Most of the studies have shown that absorptive capacity has a positive impact on innovation performance. Absorptive capacity promotes the enterprise's innovation performance from innovation speed, innovation frequency and innovation level (Kostopoulos *et al.,* 2011). The absorptive capacity at a high level can bring many benefits for the enterprise, such as first-mover advantages, rapid response to customer needs, and avoid the "lock-in effect" and "competence trap"(Cohen and Levinthal,1990; Hamel,1991), which can encourage enterprises to gain higher innovation performance. The different dimensions of absorptive capacity also play different roles in promoting innovation. Zahra &George (2002) believe that potential absorptive capacity help companies identify and obtain new external knowledge, realized absorptive capacity enables enterprises to combine existing knowledge and new knowledge to develop new ideas and new inference, and apply it to solve practical problems. Acquisition ability is helpful in finding more opportunities, useful in helping enterprises to better understand customer needs, and thus target product improvement and new product development (Nieto and Quevedo, 2005). The ability of assimilation and transformation can help enterprises to avoid the path dependence, so that it will enable enterprises to better respond to changes (Todorova and Durisin, 2007). The application ability is a necessary step to transform knowledge into practical application, and will contribute to the formation of new products or new ideas (Neergaard, 2005).

In conclusion, organizational forgetting is the basis and premise of the formation of enterprise absorptive capacity, and absorptive capacity is the basis for the continuous success of innovation. On one hand, the organization should deal with the external acquired knowledge, and then apply it to new process technology or new product development through identification and transformation. On the other hand, organizations have to abandon some of the existing knowledge through organizational forgetting. Only if organizations eliminate outdated knowledge or overcome bad habits of development can they free up space to absorb new knowledge. This means that the organizational forgetting can reconstruct the organizational memory system and enhance learning ability by developing a re-formed absorptive capacity, leading to improved organizational flexibility through absorption capacity and promotion of innovation.

Hypothesis 2. Absorptive capacity will mediate the relationships between organizational forgetting and innovation performance.

2.3 The moderating effects of environmental turbulence.

The environment is important to analyzing the effects of absorptive capacity because different environments imply different valuations of dynamic capabilities (Eisenhardt and Martin, 2000). Under turbulent environments, firm's innovation may be promoted by dynamic capabilities (Helfat *et al*., 2007; Song et al., 2005). In contrast, firm's capabilities may lead to organizational inertia (Leonard-Barton,1992). Scholars study absorptive capacity based on the view of dynamic capability, therefore, the effect of absorptive capacity may be different based on the level of environmental turbulence. However, these boundary conditions have been relatively neglected in previous absorptive capacity research (Lane *et al*.,2006).

Environmental turbulence refers to the unpredictability of changes in external environment (Hanvanich *et al*. 2006; Danneels and Sethi 2011) which includes two dimensions: technological turbulence and market turbulence (e.g., Dayan and Basarir 2010; Jaworski and Kohli 1993). When the

level of environmental turbulence is high, organizational forgetting seems to have higher impact on absorptive capacity. Rapid changes in environment quickly make current knowledge and methods obsolete. In this case, firms must constantly update and introduce new knowledge and methods to minimize the threat of obsolescence (Jansen *et al.* 2006; Lumpkin and Dess,2001). In a turbulent environment, some scholars have suggested that chaotic environment will change the organizational memory because the existing structure of beliefs, norms and culture, as memories, may not allow to handle the inconsistent information and the existing belief structure may not explain the new facts any longer. The new knowledge will cause prior knowledge to be deemed obsolete, forcing people to modify this knowledge and adapt to the new environment (Moorman and Miner,1997). Firms may be able to use the existing knowledge structure to maintain its success under stable environment, but it will breed organizational inertia in the long run, waning the ability to recognize and respond the external environment. Lack of active search and absorption of external information will not be conducive to fostering absorptive capacity. The more turbulent the environment is, the more firms need to keep conducting necessary assessments on the uncertainty about the future and contemplate organizational forgetting management. Firms need to identify and evaluate the old knowledge and experience, update the current knowledge and integrate and apply organizational systems and processes so as to get rid of the core rigidity. In this process, organizations will continue to acquire and absorb new knowledge, ideas and technologies and promote the absorption capacity.

Based on the aforementioned arguments, we expect that the effect of organizational forgetting on absorptive capacity will increase as environmental turbulence increases. The performance effect of organizational forgetting is stronger when environmental turbulence is higher. Therefore, we hypothesize the following:

Hypothesis 3. Environmental turbulence provides a positive adjustment between organizational forgetting and absorptive capacity.

Hypothesis 2 and Hypothesis 3 further revealed an intermediary role model being moderated. Specifically, in a higher environmental turbulence, organizational forgetting will have a stronger impact on the absorption capacity, and thus enhance the innovation performance of enterprises notably. However, the influence of organizational forgetting on innovation performance will be accomplished less by absorbing ability. Based on the above analysis, we put forth the following hypothesis:

Hypothesis 4. Environmental turbulence will moderate the strength of the mediated relationships between organizational forgetting with innovation performance via absorption capacity, such that the mediated relationship will be stronger under high environmental turbulence than under low environmental turbulence.

Based on the above theoretical analysis, we propose a moderated mediator model in order to reveal, in detail, how the organizational forgetting promotes innovation performance in realistic Chinese organizational environments, and the boundary conditions produced by this kind of effect in the perspective of environmental turbulence. Environmental turbulence will adjust the first half of absorptive capacity 's path, the model shows that the mediating effects on the relationship between organizational forgetting and innovation performance regulated by environmental turbulence. The model is shown in Figure 1.

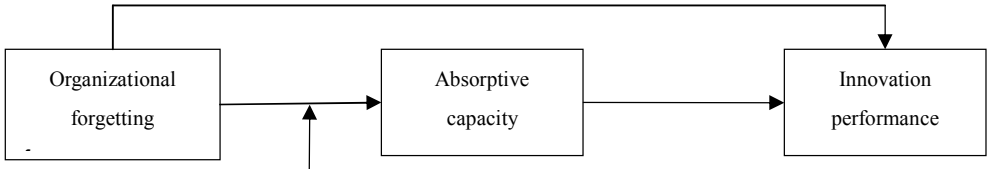

Figure1. The conceptual model

3. Samples and measures

3.1 The sample and data collection

The sample includes firms in such industries as technology, manufacturing, information and communication, and chemicals. We initially assembled a questionnaire utilizing measurement items from several previous studies mainly reported in Western academic journals. A back translation procedure was performed to ensure translation accuracy. To ensure the intelligibility of our questionnaire items, we undertook informal interviews with 15 senior managers from top-or middle-level positions within their organizations before the implementation of the survey—asking them to point out ambiguous, vague, or unfamiliar terms, and incorporated their feedback to improve the questionnaire's readability and relevance. Based on these interviews, the questionnaire was refined, and the survey process was finalized.

We worked with a professional survey institute (http://www.sojump.com) which helps to collect valid questionnaire data for academics in China. After signing a contract, the company randomly conducted questionnaires using email and online communication software such as WeChat, QQ, MSN etc. One of the co-authors participated in the data collection process, and administrated the survey through online communication with the respondents. The questionnaires were distributed for six months, from among the 818 firms of which 320 provided fully valid responses to the questionnaire.

The respondents were promised complete confidentiality, were assured that there were no correct or incorrect answers, and were asked to answer the questions as honestly as possible. To check for non-response bias, we compared responding and non-responding enterprises in terms of attributes such as enterprise industry and enterprise size using the t-test. All t-statistics were found insignificant. In addition, the likelihood of non-response bias was tested further by splitting the total sample into two groups, based on the times during which the enterprises responded (Armstrong and Overton, 1977). The responses of late respondents, who were those that responded after more than two weeks, were compared to the responses of early respondents, who were those for which we received responses within two weeks. A comparison of the two groups revealed no significant differences. Therefore, non-response bias was not expected to be a serious problem, and we saw the respondents as representative of the general enterprises.

Table I. Sample description of the questionnaire

	Measurement content	Quantity	%
Enterprise industry	High and new technology industry	109	34.2%
	Manufacturing industry	106	33.1%
	Service industry	105	32.7%
Enterprise size	100-500	116	36.1%
	500-2000	103	32.3%
	More than 2000	101	31.6%
Enterprise age	3-5 years	36	11.3%

	6-10 years	39	12.3%
	11-20 years	142	44.3%
	More than 20 years	103	32.1%
Enterprise property	State-owned enterprise	67	20.9%
	Private enterprise	157	49.1%
	Joint-stock enterprise	61	19.1%
	Joint venture and foreign-capital enterprise	35	10.9%

3.2 Measures

In this study, we developed the scales based on existing literatures and theories, as well as based on our field interviews and investigation. All of the multi-item measures were rated based on a seven-point Likert scale, ranging from 1=completely disagree to 7=totally agree. We averaged the items to create the scores for the constructs.

3.2.1 The antecedent variable :the organizational forgetting (OF). The measure used to capture organizational forgetting was prepared on the basis of the contributions of Akgun *et al*(2007).

3.2.2 *The outcome variable: the innovation performance (IP)*. Following Yayavaram and Chen (2013), we considered innovation performance as the outputs or impacts of a firm's inventions, and measured it with six items based on Chen and Liu (2011). These items were answered by the respondent in each firm, i.e., either the general manager or the head of marketing, depending on the firm's structure. Respondents were asked how far they agreed with statements on aspects of innovations the firm had introduced within the last three year. An example item is, the ratio of new product sales to total sales.

3.2.3 *Mediating variable: the absorptive capacity (AC)*. We essentially adapted the items used by Zahra and George (2002). The Potential absorptive capacity, comprising the processes of acquisition and assimilation, was measured by the six items; Realized absorptive capacity, comprising the processes of transformation and application, was measured with six items.

3.2.4 *Regulated variable: the environmental turbulence (ET)*. As we mentioned above, we measured market turbulence as the rate of change in customer preferences for products. The scale for market turbulence are based on the work of Olson *et al*. (2005), consisted of two items taken from Jaworski and Kohli (1993). This study measured technological turbulence as the rate of change in technology. The measurement was carried out using a scale of 4 items in the proposals of Jaworski and Kohli (1993).

3.2.5 *Control variables:* This study uses the enterprise attributes of age, size, property, and industry as control variables because previous studies have indicated that these variables can affect innovation performance (Ahuja, 2000; Sorensen and Stuart, 2000; Taylor and Greve, 2006). More concretely, we controlled for industry sector, coding 1 for high and new technology industry and 0 for others; we measured enterprise property, coding 1 for state-owned enterprise 1, 0 for others ·; we calculated a enterprise's age from the period enterprise setting up; we proxied enterprise size as the natural logarithm of the total number of employees.

This study used Cronbach's α coefficient to test the reliability of the items in the questionnaire, the greater the Cronbach's α coefficient, the higher the reliability of the tested factor, the stronger the internal consistency of the questionnaire. The Cronbach's α coefficients of these variables were greater than 0.8 which shows favorable internal consistency between questionnaires and the scale. The convergent validity was tested based on factor loading, CR and value of AVE, they were greater than 0.5, 0.6 and 0.5 which shows better convergent validity. We used confirmatory factor analyses (CFAs)

by AMOS17.0 software to test the construct validity test and the fit indices showed that the measurement model fit the data reasonably well (Table II). Meanwhile, the fitting index of several measurement models is also compared. Four factor measurement model is superior to other models which shows the discriminant validity of model was high (Table III).

Table II Construct measurement, reliability and validity

Construct (source)/indicator	Loading 1	Loading 2	Reliability and validity
Innovation performance (α =0.90,CR=0.92, AVE=0.66)			
the speed of new product development	0.78		χ^2 = 21.281; *Df* =9; p < 0.05; CFI =0.985; TLI =0.975 ; IFI=0.985 ; RMSEA=0.072
the ratio of new product sales to total sales	0.84		
the growth rate of patent counts	0.81		
the success rate of marketing new products	0.82		
the rate of turnover of new products	0.79		
improvements in the process technology and equipment	0.84		
Absorptive capacity (α =0.91,CR=0.95, AVE=0.65)			
Potential absorptive capacity			
The ability of an enterprise to identify external knowledge	0.70		χ^2 =133.521 ; *Df* =53 ; p < 0.05; CFI =0.959; TLI =0.949; IFI=0960; RMSEA=0.076
Resources for enterprises to look for external knowledge inputs	0.68		
The ability of enterprises to discover external knowledge sources	0.81		
The speed of introducing external knowledge	0.85		
The ability of enterprises to organize and classify external knowledge	0.82		
The ability of enterprises to understand external knowledge	0.81		
Realized absorptive capacity			
The ability of enterprises to transform external knowledge into their own knowledge		0.79	
The frequency of updating old knowledge		0.82	
The ability of enterprises to improve the original technology by applying new knowledge		0.83	
The ability of enterprises to provide new knowledge quickly and efficiently		0.84	
The ability of enterprises to apply new knowledge to production		0.85	
The ability of enterprises to apply new knowledge to related products and services		0.80	
Environmental turbulence (α =0.83,CR=0.92, AVE=0.61)			
The technology in our industry is changing rapidly	0.78		χ^2 =17.151; *Df* =13; p < 0.05; CFI =0.993; TLI =0.989; IFI=0.993; RMSEA=0.035
Technological changes provide big opportunities in our industry	0.82		
A large number of new product ideas have been made possible through technological breakthroughs in our industry	0.83		
It is very difficult to forecast technological progress in next three years	0.81		
The customers' preference obviously changed over time		0.74	
Customers tend to seek new products and service		0.75	

Organizational forgetting(α =0.95,CR=0.97, AVE=0.81)		
The company will introduce new knowledge that conflicts with previously experience and skill	0.86	χ^2 =11.118; *Df* =5; p < 0.05; CFI =0995; TLI =0.9; IFI=0.995; RMSEA=0.043
The organization can change the new product development process according to the change of the external environment	0.92	
The organization is able to continuously optimize its team decision-making process	0.93	
Organizations can change their internal information sharing mechanism	0.92	
Companies are willing to acquire new technologies from different sources	0.88	

Table III Results of confirmatory factor analysis for the measures of the variables

Model		χ^2	*Df*	TLI	CFI	RMSEA
Four factors	OF, IP ,AP, ET	123.7	84	0.980	0.984	0.043
Three factors 1	AC+ EI ,OF, IP	218.2	87	0.936	0.947	0.076
Three factors 2	AC+ OF,IP,EI	219.3	87	0.936	0.947	0.076
Three factors 3	OF+ EI,IP,AC	317.7	87	0.887	0.907	0.101
Two factors	OF +AC+ ET,IP	412.3	89	0.847	0.870	0.118
One factor	OF +AC+ ET+IP	1075.2	90	0.538	0.604	0.205

3.3 Assessing common method variance

We conducted a CFA to test common method bias. A model with a single factor linking all items of the variables (shown in Table ⅡI) was assessed. This model did not fit the data. Moreover, We checked the possible common method bias using Harman's single -factor test which is one of the most widely used techniques employed by researchers (Andersson and Bateman, 1997; Aulakh and Gencturk, 2000). The results show that the four common factors whose "trait" values are greater than 1 explain 70.41 percent of the total variance. Because the "trait" value of the greatest explanation of the common factors only explains 14.08 percent of the total variance, common method bias is unlikely to be a threat to the findings of this study. (Iverson and Maguire, 2000; Mossholder et al., 1998).

4. Empirical results

4.1 Descriptive statistics

Table IV presents the means, standard deviations, and correlations for all of the key variables. We found that organizational forgetting was significantly correlated to absorptive capacity (r =*0.*25, p <0.01) and innovation performance (r=0.13, p<0.01). Moreover, innovation performance and absorptive capacity were significantly correlated (r = *0.*19, p <0.01), providing some initial evidence for the hypotheses.

Table IV Descriptive statistics and correlations

Variable	Mean	S.D	1	2	3	4	5	6	7	8
Firm property	0.21	0.41	1							
Firm age	20.13	18.68	0.16*	1						
Firm size	6.89	2.18	0.12*	0.34**	1					
Firm industry	0.21	0.41	-0.04	-0.12	-0.1*	1				

OF	5.06	0.68	0.04	0.14*	0.08	0.05	1			
AC	4.73	0.47	-0.03	0.15*	-0.03	-0.04	0.25**	1		
ET	4.35	0.52	0.05	0.06	0.09	0.08	0.28*	0.48**	1	
IP	5.68	0.77	-0.17*	0.12**	0.13	-0.12	0.13**	0.19**	0.26**	1

4.2 Analysis and results

This study uses the SPSS 18.0 statistical software to carry out the hierarchical regression analysis. We removed the mean-centers of all the pertinent antecedent variables as a preconditioning requirement, and then created the interaction terms by multiplying them together after preconditioning (Aiken and West, 1991).

Table V Results of Hierarchical Regression Analysis Predicting IP and AC

	Innovation performance			Absorptive capacity	
	M1	*M2*	*M3*	M4	M5
Firm industry	-0.05	-0.06	0.05	-0.02	-0.05
Firm age	-0.10	-0.09	-0.09	0.01	0.02
Firm size	0.09	0.10	0.11	-0.06	-0.08
Firm property	-0.20	-0.15	-0.16	-0.04	-0.06
OF	0.18***		0.02	0.24***	0.26***
AC		0.22***	0.19***		
ET					0.28***
OF× ET					0.10*
R^2	0.22	0.28	0.20	0.34	0.35
Change in R^2	0.12	0.18	0.09	0.26	0.01

Note. *N = 320*. *p<0.05; **p<0.01 , *** p<0.001 (two-tailed tests). OF = organizational forgetting; ET = environmental turbulence; AC = absorptive capacity

Table V presents the results of hierarchical regression analysis. M1 shows that organizational forgetting was positively associated with innovation performance (β =0.18, *p* <0.001), thus, hypothesis 1 was supported. Hypothesis 2 proposed that absorptive capacity mediates the relationship for organizational forgetting with innovation performance. Mediating effects were tested according to Baron and Kenny's (1986), four steps are necessary: (a) the independent variable is significantly related to the mediator; (b) the independent variable is significantly related to the dependent variable; (c) the mediator is significantly related to the dependent variable; and (d) the effect of the independent variable becomes significantly smaller (partial mediation) or has no effect on the dependent variable (full mediation) when the mediator is added. The results show that (a) organizational forgetting was positively related to absorptive capacity (β = 0.24, p < 0.001,); (b) organizational forgetting was positively associated with innovation performance (β =0.18, p <0.001); (c) absorptive capacity was positively related to innovation performance (β = 0.22, p <0.001); and (d) when innovation performance is regressed simultaneously on the organizational forgetting and absorptive capacity, the effect of organizational forgetting turns insignificant (β=0.02), which indicated full mediation.

To test the moderated mediation (Hypothesis 4), we examined four conditions (Muller, Judd, & Yzerbyt, 2005; Preacher, Rucker, & Hayes, 2007): (a) significant effect of organizational forgetting on innovation performance; (b) significant interaction between organizational forgetting and

environmental turbulence in predicting absorptive capacity; (c) significant effect of absorptive capacity on innovation performance; and (d) different conditional indirect effect of organizational forgetting on innovation performance, via absorptive capacity, across low and high levels of environmental turbulence.

Our results for Hypothesis 1, which demonstrated that organizational forgetting was significantly related to innovation performance, supported Condition (a) for moderated mediation. Table V presents moderated regressions results of environmental turbulence. It shows that the interaction term for organizational forgetting with environmental turbulence was significant in predicting absorptive capacity (β =0.10, $p < 0.05$, M5). Hence, hypothesis 3 was supported and this satisfied Condition (b).

The results for Hypothesis 2 supported Condition (c), in which absorptive capacity was positively related to innovation performance. Hence, results based on the first three conditions indicate that environmental turbulence could moderate the mediation of absorptive capacity for the organizational forgetting–innovation performance association.

To further validate findings of moderated mediation relationships, according to Preacher, Rucker and Hayes (2007), we operationalized high and low levels of environmental turbulence as one standard deviation above and below the variable's mean score. Results in Table VI show that, the conditional indirect effect of organizational forgetting was stronger and significant in the high environmental turbulence (*indirect effect*=0.054, *SE* =0.018, P<0.01) than in the low environmental turbulence condition (*indirect effect = 0*.031, *SE* = 0.011, P<0.01). Taken together, hypothesis 4 was supported.

Table VI The bootstrap test of moderating mediation effects

Moderator	Level	condition *indirect effect*	*SE*	LL 95% CI	UL 95% CI
	High	0.054**	0.018	0.028	0.094
ET	Low	0.031**	0.011	0.015	0.057
	High-Low	0.023**	0.012	0.008	0.054

*p<0.05, **p<0.01,n=320, CI=confidence interval, Bootstrap samples=5000

5. Discussion

5.1 Theoretical implications

This study develops a research model linking organizational forgetting, absorptive capacity, and innovation performance. Particularly, it takes environmental turbulence into the analysis framework and examines its regulatory role in the relationship between the organizational forgetting and the absorptive capacity. The model was empirically investigated via responses to a survey of 320 Chinese enterprises. The results reveal three major theoretical implications, which we consider in turn.

First, we offer a richer understanding of the role of the organizational forgetting to enterprise innovation performance. Previous studies have emphasized the importance of the organizational forgetting, but they offers conflicting views regarding whether the organizational forgetting affects its innovation performance directly. The effect mechanism of the organizational forgetting on innovation performance was investigated based on static resource-based view in existing researches, which is difficult to explain how to obtain competitive advantages for enterprises under the dynamic environment. This study is the first to introduce absorptive capacity as an important dynamic capability into the field of organizational forgetting and explores its mediated role between organizational forgetting and firm performance. Our study finds that organizational forgetting can not promote organization's innovation performance without absorptive capacity. This is not only a new explanation

for research on organizational forgetting and enterprise innovation, but also an important development and supplement to the research of organizational forgetting and absorptive capacity.

Second, contrasting with previous research, we add to the literature by exploring the boundary condition of organizational forgetting on innovative performance. In particular, we find organizational forgetting is not equally positive but instead increases with the level of environmental turbulence. The indirect effect of organizational forgetting on innovation performance via absorptive capacity was significant stronger when environmental turbulence was higher. These findings illustrate that the relationship between organizational forgetting and innovation performance might not be a straightforward association as is assumed in pervious research. The findings rather point to the importance of contextual variables which moderate this relationship. Absorptive capacity doesn't occur in a vacuum, the moderated mediation model not only takes into account the boundary condition of the mediating role of absorptive capacity between organizational forgetting and enterprise innovation, but also further confirms the situation and effectiveness of organizational forgetting.

5.2 Managerial implications

This study also offers some important managerial implications for how to increase innovation performance for enterprises, particularly for enterprises in China. First, because the effect of organizational forgetting on innovation performance is moderated by the environments turbulence, managers must make a judgment about degree of the environment turbulence by identifying the change speed of technology and market demand in the environment. Second, managers need to pay attention to organizational forgetting behavior, take targeted measures and track the process. The managers must be aware of the negative effects of outdated knowledge, values, beliefs and practices and should continue to test the validity of existing knowledge and practice, and enhance organizational flexibility. Third, managers should promote organizational forgetting behaviors among members consciously, eliminate barriers for learning new knowledge and improve the speed of searching for knowledge. It is notable that organizational forgetting is a gradual process; if implemented hastily, it may lead to psychological fluctuations or rebound among members.

5.3 Limitations and future research directions

This study points out the value and significance of organizational forgetting, and puts forwards a solution for improvement of enterprise innovation performance. There are limitations in the present work which would need to be addressed in future research. First, the sample data of this study is cross-industry, to a certain extent, it has some influence on explanation of the causal inference and the mechanism of research. Future research may consider adopting longitudinal research or depth interviews and other qualitative studies，further explore the influential process of organizational forgetting on innovation, enrich the research of the relationship between organizational forgetting and its antecedents and outcomes and related mechanism, and empirical test in order to obtain more rigorous conclusions. Secondly, we posited and found that the external environment has a moderating effect on the mediation mechanism, but did not discuss the influence of the internal factors. Therefore, we suggest that future research could examine the impact of the internal context variables on organizational forgetting and innovation performance, such as organizational culture on the basis of this study. Thirdly, we have adopted a consistent approach to the existing literature, focusing on the whole structure of organizational forgetting, however, some scholars have made different dimensions for organizational forgetting (Cegarra-Navarro et al. 2005,2010; Yildiz and Fey, 2010). In order to push organizational forgetting into a further development, we suggest that future research distinguish

the dimensions of organizational forgetting and study the specific effects or mechanisms. For example, do different dimensions have different effects on innovation? Whether there will be a different internal mechanism?

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