The Impact of Unlearning on Learning at Individual Level

Kiyoshi Takahashi [+] and Mai Huong Hoang

School of Business Administration, Kobe University, Japan

Abstract. Organizations must learn new management and market practices to be competitive and adaptive to the rapidly changing environment. Prior to learning, it is often observed that unlearning takes place where obsolete knowledge and behaviors are discarded and replaced with new ones. This study investigates the impact of unlearning on learning at individual level. Using the three-factor model of unlearning, the present study attempts to demonstrate the crucial function of mental model unlearning that works for discarding irrelevant procedural/business practices and for acquiring new ones thereafter. Data was collected from 556 employees working in Japanese companies. Results found that three domains of unlearning exerted positive effects on the corresponding domains of learning. In addition, it showed the importance of changing mental model as the facilitator of subsequent changes in procedural and business unlearning.

Keywords: Unlearning, learning, mental model, changes, obsolete knowledge and behaviors.

1. Introduction

Learning happens in every organization in many ways. Organizations must learn and acquire new knowledge and technology quickly in order to adapt to the changing business environments. Various factors may change the process of learning in organizations. Among others, unlearning is considered as the preliminary condition for learning to take place (Nystrom and Starbuck, 1984, Hedberg, 1981). Like the case of learning, unlearning is a dynamic process. By unlearning, organizations and their members acknowledge and discard obsolete knowledge and routines to accommodate new information and behaviors, if any (Takahashi, Arshynnikova, and Nakamori, 2016). The core competence that has once made up the organizational competitive advantages may become obsolete over time and may turn into rigidities (Leoneard-Barton, 1995). Without eliminating such fixed knowledge and routines, organizations hardly attain novel competence to be competitive again in the new environment. Therefore, it is unquestionable that unlearning plays an important role for fostering learning, knowledge creation, and changes in organizations (Akgün, Byrne, Lynn, and Keskin, 2007; Becker, 2010).

Most of unlearning studies take it as an organizational phenomenon. While, individual unlearning is an important medium of organizational unlearning because the typical organization relinquishes knowledge and routine through its members. Considering the scarcity in research efforts in this field, this study aims at investigating empirically the influence of unlearning on learning at individual level. Based on the three-factor model of unlearning, i.e., mental unlearning, procedural unlearning, and business unlearning (Takahashi et al., 2015, 2016), this study proposes a cause-effect model that explores the role of unlearning factors on its corresponding learning factors. Simultaneously, it investigates the importance of mental unlearning over the other domains of unlearning and learning.

2. Literature Review

2.1. Structure of Unlearning

[+] Corresponding author. Tel.: +8178-803-6944; fax: +8178-803-6944.
E-mail address: ktakahas@kobe-u.ac.jp.

In fact, Takahashi et al. (2015, 2016) proposed a three-factor model of individual unlearning in organizations. By the result of exploratory factor analysis (EFA), they reported that unlearning has a structure that constitutes three underlying factors: mental model unlearning (disposal of obsolete beliefs, pride, values, mission, vision, etc.), procedural unlearning (disposal of obsolete internal procedures, organizational processes, internal structure, equipment, and technology), and business unlearning (disposal of old clients, suppliers, markets, core products and services, and business domains).

Note that mental model takes the central position in learning and unlearning. Mental model is a set values, beliefs, assumptions, and knowledge that have been developed over time (Preskill and Torres, 1999). It works to guide people in their everyday lives by framing the way people understand, interpret, and act upon their world (Duffy, 2003). Therefore, a change in mental models leads to alter the way people behave. Akgün et al. (2007) recognize that unlearning happens on three dimensions: beliefs, routines, and physical artifacts. Among those three, unlearning of beliefs takes a critical role that motivates the other two unlearning. According to them, unlearning in mental model organizes the changes and eliminations of non-cognitive practices, such that changes in technology or procedures follow unlearning in beliefs. Their proposals provoke the question whether change in mental model results in eliminating obsolete procedural and business practices. Likewise, there are similar effects of acquiring new mental model on the acquisition of new procedural and business practices. Therefore, we propose two hypotheses:

H1: Mental model unlearning exerts positive effects on procedural unlearning and business unlearning.
H2: Mental model learning exerts positive effects on procedural learning and business learning.

2.2. The Effect of Unlearning on Learning

Effects of unlearning on learning have received considerable attention from researchers (Hedberg, 1981; Tsang and Zahra, 2008). Regarding the nexus or order of appearance between leaning and unlearning, Akgün et al. (2007) suggested that unlearning is a prerequisite of new knowledge that catalyzes the learning process thereafter. Sinkula (2002) also proposed that because past knowledge inhibits new learning, unlearning must precede learning: If an organization wants to learn new knowledge at period t, it must unlearn old knowledge at period t-1. The model of unlearning structure helps us excavating the influence of unlearning on learning. We then propose three hypotheses:

H3: Mental model unlearning exerts a positive effect on mental model learning.

H4: Procedural unlearning exerts a positive effect on procedural learning.

H5: Business unlearning exerts a positive effect on business learning.

3. Method

Data was collected among 1,800 employees working in Japanese companies through a commercial online-survey company. Data monitoring was carried out in order to omit respondents who did not match the requirement of the survey. After this step, the sample size was reduced to 556. The survey questionnaire includes three sections. All questions are self-answered. The first section covers demographic variables covering participants' age, gender, length of tenure, and position in the company. It also captures the descriptions of companies that participants are working in, e.g., age and industry of the firm.

The next section contains questions regarding unlearning. As unlearning brings a certain level of resistance (Tsang and Zahra, 2008), it is measured by two approaches: discarding experience and difficulty. Both approaches encompass three types of unlearning: mental model unlearning, procedural unlearning, and business unlearning. Participants were asked to identify the difficulty of discarding obsolete knowledge if they did experience it in the past.

Similar to the unlearning scale, learning is captured in the third section by two approaches: acquisition experience and difficulty. Participants who experienced unlearning are asked if they acquire new knowledge and routines after that. They also respond the level of difficulty when obtaining new knowledge. Both unlearning and learning variables were measured by Likert scales ranging from 1 (quite easy) to 5 (quite

difficult). All responses were reverse-coded, indicating that the lower score means as easy and effortless to discard or acquire knowledge and routines.

Results of descriptive statistics are shown in figures 1 and 2. Regarding the content of knowledge discarded, 'values' had the highest frequency (33.33%). Although the previous literature (Hislop et al., 2013; Macdonald, 2002; Rushmer and Davies, 2004) advocated that values were the hardest to be unlearnt, this study found the adverse evidences. The least discarded one is business domain (7.01%). Elements of mental unlearning－values (33.33%), pride (24.61%), vision and mission (23.63%), and beliefs (22.36%)－were experienced more frequently than those of procedural unlearning－internal structure (20.93%), operational processes (20.10%), internal procedures (19.27%)－and business unlearning－suppliers and partners (20.86%), markets (12.23%), core products and services (10.97%), clients (8.51%), and business domain (7.01%).
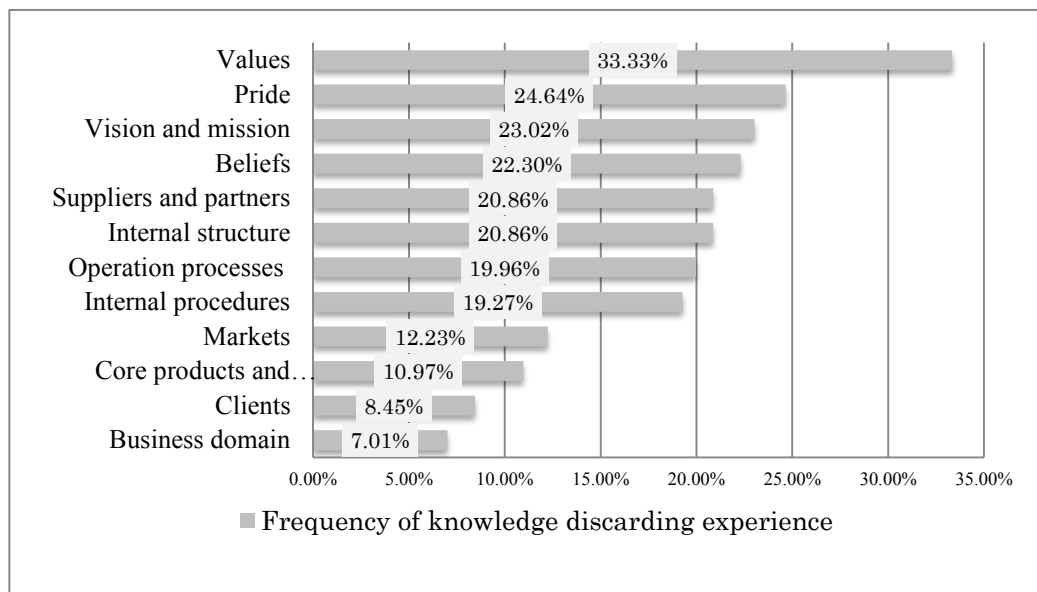

Fig. 1: Frequency of knowledge discarding experience

Approximately ninety percent (87.59%) of respondents acquired new knowledge after discarding the obsolete ones. Internal procedure was the highest type of knowledge acquired and replaced after being unlearnt (32.37 %). Business domain had the lowest knowledge replacement percentage recorded (5.58%).
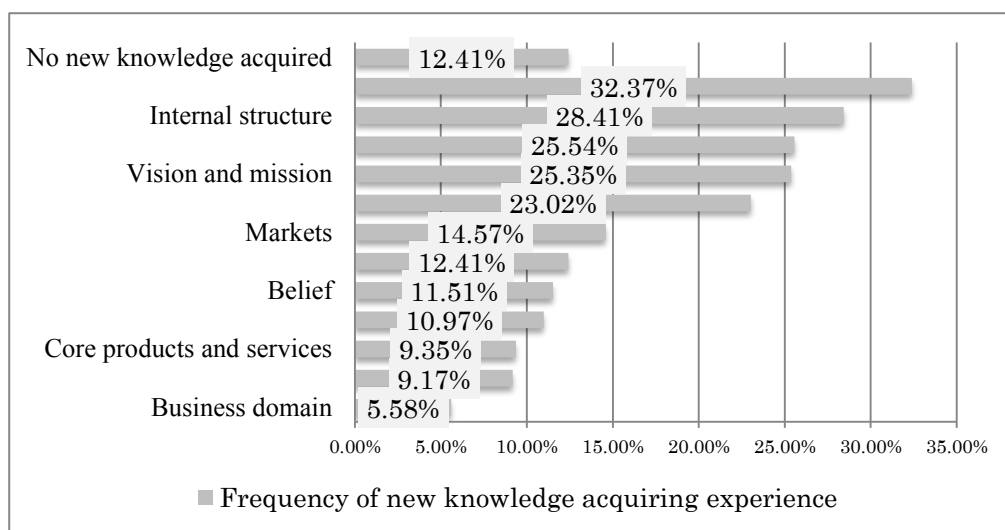

Fig. 2: Frequency of new knowledge acquiring experience

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Partial least-square structural equation modeling (PLS-SEM) was chosen as the analytical method for this study. Both learning and unlearning are treated as formative constructs in this study, implying that composite reliabilities and average variances extracted are not calculated for those constructs (or factors). Result of the measurement model showed that all VIF were less than 5.0, indicating that there was no problem of multi-collinearities among the factors.

Table 1: Loadings and weights for unlearning and learning

Construct	Items	Loadings		Weights	
		Outer loading	p-value	Outer weight	p-value
Mental model unlearning	Beliefs unlearning	.780	.000	.430	.000
	Values unlearning	.833	.000	.527	.000
	Vision & mission unlearning	.682	.000	.304	.011
	Pride unlearning	.424	.000	.042	.728
Procedural unlearning	Internal procedures unlearning	.597	.000	.281	.151
	Internal structure unlearning	.741	.000	.551	.000
	Operation processes unlearning	.769	.000	.551	.014
Business unlearning	Clients unlearning	.532	.001	.242	.094
	Suppliers & partners unlearning	.467	.000	.051	.708
	Markets unlearning	.705	.000	.401	.020
	Core products and services unlearning	.526	.000	.251	.181
	Business domain unlearning	.628	.000	.364	.133
Mental model learning	Beliefs learning	.691	.000	.290	.072
	Values learning	.724	.000	.345	.002
	Vision & mission learning	.789	.000	.479	.000
	Pride learning	.615	.000	.280	.003
Procedural learning	Internal procedures learning	.720	.000	.500	.003
	Internal structure learning	.679	.000	.416	.004
	Operation processes learning	.656	.001	.545	.008
Business learning	Clients learning	.656	.000	.456	.007
	Suppliers & partners learning	.476	.000	.051	.708
	Markets learning	.705	.000	.456	.003
	Core products and services learning	.656	.000	.346	.076
	Business domain learning	.532	.000	.231	.340

4. Results

Results of structural equation modeling were reported in Table 1. Bootstrapping of 5,000 resamples was conducted with the number of bootstrapped cases equal to the number of valid observation. Figure 1 reported the explained variance of endogenous variables (R^2). Looking at the cause-effect relationship between mental model unlearning and learning, 11.6% of variance in mental model learning was explained by unlearning of the same construct, indicating that mental model unlearning goes ahead of mental model learning. Regarding the path relationships among unlearning, 7.7% and 10.2% of variances of procedural unlearning and business unlearning were caused by the mental model unlearning, respectively.

Regarding the effects on to learning of internal procedure, unlearning of prior procedure and learning of new mental model together explained 21.3% of the variance of procedural learning. Similarly, unlearning of prior business customs and learning of new mental model together explained 20.7% of the variance of business learning.

The results of path coefficients showed that unlearning of mental model took vital functions for unlearning the internal procedure and business customs. Figure 1 reported significant positive coefficients between mental model unlearning and procedural unlearning ($\beta=.281$, $p<.001$) as well as between mental model unlearning and business unlearning ($\beta=.322$, $p<.001$). The similar propensity was observed in learning. Results found significant positive path coefficients between mental model learning and procedural learning ($\beta=.348$, $p<.001$) and between mental model learning and business learning ($\beta=.238$, $p<.01$). Therefore, H1 and H2 were supported empirically.

Hypotheses 3 to 5 investigate the influences of unlearning on learning in three domains. Path coefficients shown in Figure 1 found significant positive coefficients between each factor of unlearning and its corresponding learning: The path from mental model unlearning to mental model learning found a

standardized coefficient of β=.343 (p<.01); the path from procedural unlearning to procedural learning with β=.264 (p<.001); and the path from business unlearning to business learning with β=.349 (p<.001). Therefore, H3, H4, and H5 were supported by the evidence.
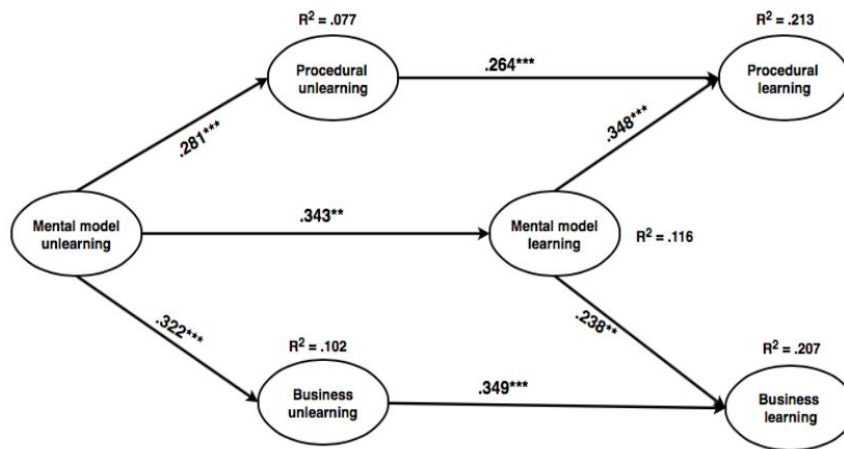

Fig. 3: Results of structural equation modeling

5. Discussion

Findings of the study highlight two important points. First, the present study supported the theoretical proposition that unlearning is the catalyst of learning (Sinkula, 2002; Tsang and Zahra, 2008). Second, as was hypothesized by Preskill and Torres (1999) and Akgün et al. (2007), this study empirically revealed that the mental model triggered the changes in unlearning and learning practices.

The structural equation modeling (SEM) analysis found that all domains of unlearning and learning were interdependent. Prior to this study, it is acknowledged intuitively that unlearning is an important precondition that facilitates learning at both individual and organizational levels. Unlearning is critical for learning and innovation in organizations such that inability to unlearn has been recognized as a prime inhibitor for the innovative processes (Assink, 2006).

The last 30 years have witnessed intensive changes in the way innovation shaping the global business. The transition from static business context to turbulent environment has forced companies to face with harsh competition and urgency of innovating (Tushman and Anderson, 1986). It is undeniable that innovation holds the key for survival and development of companies (Assink, 2006; Cohen and Levinthal, 1990; Van de Ven and Polley, 1992).

Not only budget constraints (Neely and Hill, 1999; Harper and Becker, 2004) but also the problem of mindset barrier makes innovation hard to start. By this research, it was clarified that mindset or mental model have borne the critical mechanisms for unlearning and learning in restructuring processes with respect to business and organizational routines. This finding sheds light on the aspect overlooked by and left behind the brilliant and attractive constructs like innovation and organizational learning.

Findings of the study suggest that any new learning in procedural and business fields start with mental model unlearning. Because mental model is not so difficult to change, managers should think of making employees experience mental model unlearning before attempting to steam employees' learning. Mentioning the novel vision, mission and value of the organization in the form of discussion may bring positive influence to the mindset of employees, which later encourages them to take new actions.

The present study aimed at investigating the influence of unlearning on learning. However, the results only captured the correlation between these constructs Causality was not studied because neither experimental nor time-series design was taken. Therefore future research in unlearning/learning should conduct longitudinal or experimental research to clarify the direction of the effect demonstrated in this current study.

6. Acknowledgement

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