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Full Length Research Paper

Bandwagon and new technology adoption in hospital industry: The moderating roles of positive performance experience and technology investment similarity

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Many studies report organizations “follow the bandwagon” when adopting new technology, but few studies have explored whether different organizations have different responses to the bandwagon. This study asserts that positive performance experience and technology investment similarity influences an organization’s interpretation of the bandwagon, leading to different responses. This study uses the adoption of new technology in hospitals as a sample frame and adopts a longitudinal research design. The results confirm that the bandwagon has positive influence on new technology adoption. In addition, positive performance experience positively moderates the effects of bandwagon on new technology adoption; technology investment similarity, negatively moderates the effects of bandwagon. This study elaborates the understanding of the impacts of the bandwagon on organizations’ actions.

Key words: New technology adoption, bandwagon effect, positive performance experience, technology investment similarity.

INTRODUCTION

The bandwagon effect is a common phenomenon. As the number of a focal organization’s commercial peers adopting a specific action increases, a stronger and stronger pressure is exerted on the focal organization to take the same action (Abrahamson, 1991; Abrahamson and Rosenkopf, 1993). The bandwagon effect often generates normative and competitive pressures on organizations facing uncertain decisions (Abrahamson, 1991). Numerous empirical studies verify the bandwagon effect (Henisz and Delios, 2001; Gowrisankaran and Stavins, 2004). However, not all organizations in the same bandwagon context encounter similar pressure. This study intends to explore whether organizations with different experience and competitive positions have different responses to the bandwagon in a sample of new technology adoption decisions. New technology adoption is a major strategy for organizations to maintain competitive advantage and assure survival (Oliver, 1997). New technology adoption brings high uncertainty (Denis et al., 2002). For such uncertain actions, social factors often influence an organization’s decision (Haunschild and Miner, 1997; Henisz and Delios, 2001).

Organizations are more likely to adopt new technology after the bandwagon has formed. Not all organizations, however, have the same tendency to follow the bandwagon. An organization’s experience (Ingram and Baum, 1997) and competitive position (Chen, 1996) influences interpretation and response to peer trends. Interpretation and response in turn affect the probability with which an organization follows the bandwagon and adopts new technology. Few studies have explored these moderating effects. A closer examination of these effects may thus, contribute to a more complete understanding of the bandwagon effects at the organizational level.

Specifically, this study examines hypotheses regarding the

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moderating effects of positive performance experience and technology investment similarity on the bandwagon effect. Positive performance experience makes organizations confident (Sitkin, 1992). Organizations with strong confidence may then reduce information searches, thus strengthening bandwagon effects. However, organizations may also believe that they can adopt new technology based on their distinct needs (Miller, 1991), thus, weakening bandwagon effects.

An organization's strategic similarity to commercial peers may also produce similarities in cognition and evaluation, thus, strengthening bandwagon effects. However, high similarity may be accompanied with intense competition, making organizations less likely to follow peers' actions precisely to avoid more aggravating competition, thus, weakening bandwagon effects. Employing a sample of Taiwanese hospitals, this study uses longitudinal secondary data to examine whether peers' adoption of new technology leads a hospital to adopt the same technology (the bandwagon effects), while also examining the moderating effects of the focal hospital's positive performance experience and technology investment similarity on the bandwagon effects.

THEORY AND HYPOTHESES

Bandwagon effects and new technology adoption

Peers' adoption of specific innovations often influences whether an organization also adopts the innovation (Mansfield, 1961). The bandwagon forms as peers take a common action. Bandwagon theory asserts that the bandwagon has a significant impact on innovation adoption (Abrahamson and Rosenkopf, 1993). As the bandwagon forms, the bandwagon pressure arises from the number of innovation adopters, rather than from the innovation's efficiency and benefits. There are two kinds of bandwagon pressure: institutional and competitive.

Institutional bandwagon pressure occurs as an organization fears losing legitimacy from falling behind the trend (Meyer and Rowan, 1977). Institutional theory indicates that as peers adopt a specific action, the adoption takes on value beyond simple technology rationales (DiMaggio and Powell, 1983). Organizations may adopt an innovation to meet public expectations, and to maintain perceived legitimacy in order to attract external resources (Staw and Epstein, 2000).

Competitive bandwagon pressure occurs when an organization fears losing its competitive advantage. An organization may believe that peers are adopting an innovation in order to gain efficiency and increase returns. As more peers adopt the innovation, such a belief increases competitive pressure–a risk of falling behind the enhanced group average performance. To avoid this, an organization often follows the bandwagon and adopts the innovation (Abrahamson and Rosenkopf, 1993). Both institutional and competitive bandwagon pressure rise in high uncertainty conditions (Abrahamson, 1991; Haunschild and Miner, 1997), such as new technology adoption (Denis et al., 2002).

Social factors often influence uncertain decisions (Haunschild and Miner, 1997; Henisz and Delios, 2001). A higher numbers of peers adopting a new technology produce social norm and imitative pressures (Podolney, 1994). Therefore, an organization tends to conform to the institutional bandwagon pressure in new technology adoption decisions. Moreover, causal ambiguity between new technology adoption and performance can make evaluation of consequences difficult, increasing uncertainty. Following peers avoids a significant performance lag behind the group. Based on the afore arguments, we propose the following:

H_1: The more peers adopting a specific new technology, the more likely an organization is to adopt the same new technology.

Moderating role of positive performance experience

Positive performance experience may either strengthen or weaken the bandwagon effect. Positive performance experience can strengthen the bandwagon effect due to managers' evaluation failures. Positive performance experience makes decision makers less mindful of investment costs and decreases an organization's efforts in information and solution searches (Sitkin, 1992). Instead, managers often adopt widely-accepted strategic actions, regardless of whether such actions really meet the organization's specific needs (Fiol and O'Connor, 2003). Positive performance experience can also strengthen the bandwagon effect due to the need for reputation maintenance. Organizations that perform well often have good reputations (Fombrun and Shanley, 1990). A strongly performing organization that wishes to maintain its reputation must be quite concerned about the potential negative results of not following peers. As more organizations adopt a specific new technology, the technology becomes legitimized. Organizations that fail to adopt new technology which later proves beneficial, will not only perform less well, they will lose their reputations. Thus, an organization with more positive performance experience is more likely to follow the bandwagon. The study therefore, proposes H_{2a}:

H_{2a}: The more positive performance experience an organization has, the stronger the bandwagon effect on the organization's adoption of new technology.

On the other hand, positive performance experience may also weaken bandwagon effects. Organizations with more positive performance experience are often more confident (Sitkin, 1992). Confident organizations believe that they can adapt better to specific (Miller, 1991) and often make decisions based on evaluation of organizational needs. Positive performance experience increases internal confidence in judgment, reducing peer influence. If this is the case, then the reverse of H_{2a} should hold:

H_{2b}: The more positive performance experience an organization has, the weaker the bandwagon effect on the organization's adoption of new technology.

Moderating role of technology investment similarity

Strategic similarity between organizations has a significant impact on strategic actions (Deephouse, 1999). Institutional theorists argue that organizations seeking legitimacy often adopt strategies similar to peers (Oliver, 1991). Advocates of differentiation strategy suggest that organizations should adopt different strategies from peers (Porter, 1980). These opposing claims also imply conflicting claims for the relation between investment similarity and the bandwagon effect.

When an organization's technology investment is very similar to peers' investment strategy, high structural equivalence in technology investment occurs. Organizations A and B are structurally equivalent if all entities that have relationships with A have the same relationships with B, and vice versa (Wasserman and Faust, 1994). Structurally equivalent organizations have similar contacts with other entities, possessing similar information, cognition and attitudes (Marsden and Friedkin, 1993). Such organizations should also share similar views and evaluation metrics for the costs and benefits of adopting new technology. If this is correct, structurally equivalent organizations are more likely to adopt the same new technologies. This leads to H_{3a}:

H_{3a}: Organizations that have high similarity of technology investment are more likely to show stronger bandwagon effects when adopting new technology.

The niche theory, on the other hand, suggests an opposing force that actually weakens the bandwagon effect. According to niche theory (Hannan and Freeman, 1989), an organization's niche consists of the environmental resources necessary to maintain the organization's survival and operation. The more independent organizations' niches overlap, the stronger the competition. As niches increasingly share a similar competitive space, the organizations must vie for limited resources. An organization may choose to resist bandwagon pressure because, by avoiding a commonly adopted technology, direct competition can be avoided.

Technology choice plays an important role in forming a base for a niche (Stuart, 1998). When an organization's technology investment is similar to its peers', its niche will also strongly overlap with peers' niches. Following the bandwagon to adopt a specific new technology means more niche overlap. Thus, an organization attempting to improve its niche base would avoid following the bandwagon. This leads to H_{3b}:

H_{3b}: Organizations that have stronger similarities in technology investment are more likely to show weaker bandwagon effects when adopting new technology.

METHODOLOGY

Research design and sample

This study uses Taiwanese hospitals' purchase decisions for new types of high technology equipment as its sample frame, and adopts a longitudinal design with secondary data to examine the hypotheses. There are three reasons to choose this frame. First, hospitals commonly follow peers' actions (Westphal et al., 1997), making the hospital industry an appropriate sample for examining the bandwagon phenomenon. Second, high technology equipment can enhance medical diagnosis accuracy, while improving service quality and survival rates (Succi et al., 1997). Purchase decisions of high technology equipment are clearly important for hospitals. Third, purchasing new types of high technology equipment is an uncertain decision impacted by social factors (Haunschild and Miner, 1997; Henisz and Delios, 2001).

Taiwan government regulations divide high technology medical equipment into ten categories: computerized tomography scanners, radio-isotope diagnostic equipment, radio-isotope therapeutic equipment, linear accelerators, nuclear magnetic resonance tomography (NMR), shock wave lithotripsy equipment, excimer laser angioplastys, excimer laser photorefractive keratectomy equipment, implantable cardioverter-defibrillator, and rotational coronary angioplasty of rotablator. The sample includes hospitals in Taiwan from 1999 to 2002, with research data from the annual hospital utilization surveys of the Executive Yuan's Department of Health, from 1999 to 2002. Population data is from the Ministry of the Interior and the hospital yearbook of the Taiwan Hospital Association (THA). 1999 data form the basis of measurement of the new technology adoption variable. Actual numbers of hospitals covered in the study include 503 in 2000, 494 in 2001 and 524 in 2002. The study adopts the hospital-year-equipment category as a unit of analysis, with a total of 15,210 observation units from 2000 to 2002.

Measurements

Dependent and independent variables

The dependent variable, technology adoption ($NewAdoption_{i,j,t}$), is defined as the quantity of high technology equipment *j* that hospital *i* had not previously invested in before year *t*. The independent variable used to measure the bandwagon effect requires delineation of geographic areas, since organizations in the same area are under stronger competitive pressures (Baum and Mezias, 1992). This study applies an administrative geographical boundary approach (25 cities and counties in Taiwan) to identify the market area of a hospital and, furthermore, to measure the bandwagon effect. The bandwagon effect, following Henderson and Cool's (2003a, b) approach is computed as:

$$\text{Bandwagon}_{\text{i, j, t}} = \sum_{j'=1}^{n} \text{NewAdoption}_{\text{i', j, t}}\ ;\ i' \neq i$$

Where n is the total number of hospitals in the area hospital i is located.

Moderating variables: Positive performance experience and technology investment similarity

Positive performance experience is measured following the approach of Greve (2003) and Henderson and Cool (2003). First, was to check whether a hospital has higher utilization in a specific type of high technology equipment *j* compared to peers average in the same area in year *t-2* ($PE_{i,j,t-2}$). If the hospital has higher utilization, $PE_{i,j,t-2}$ is set as 1, otherwise $PE_{i,j,t-2}$ is set as 0. We next compute the hospital's positive performance experience by summing $PE_{i,j,t-2}$ across ten types of high technology equipment from year 1999 to year *t-2*. The formula is:

$$\text{Positive Performance Experience}_{i,t-1} = \sum_{88}^{t-2}\sum_{j}^{10} \text{PE}_{i,j,t-2}$$

Following Baum and Korn's (1996) method of measuring of strategic similarity, this studies measures technology investment similarity as the degree of overlap between a hospital and its peers in ten types of high technology equipment:

$$\text{Technology Investment Similarity}_{i,t-1} = \sum_{i \neq i'}^{n} W_{ii',t-1} N_{i,t-1} ,$$

$$W_{ii',t-1} = \frac{\sum (X_{i,j,t-1} = 1\, and\, X_{i',j,t-1} = 1,\quad j = 1,...,10)}{\sum (X_{i,j,t-1} = 1,\ j = 1,...,10)}\ ,\ W_{ii',t-1} \neq W_{i'i,t-1}$$

$N_{i,t-1}$ refers to the number of categories of high technology equipment owned by hospital *i* in the year *t-1*, whereas *j* stands for the ten categories. $W_{ii',t-1}$ is the overlapping ratio of the sort of high technology medical equipments owned both by hospital *i* and hospital *i'* in year t-1. $X_{i,j,t-1}$ and $X_{i',j,t-1}$ respectively refer to whether hospital *i* and hospital *i'* own the high technology medical equipment category *j* in year *t-1*; 1 indicates the hospital owns the equipment, and 0 indicates it does not.

Control variables

The current study controls for some organizational and environmental variables that may influence new technology adoption. Prior studies propose that organizations that are larger and with longer histories (Zahra et al., 2000) are more likely to adopt new technology. Therefore, we control for age ($Age_{i,t-1}$) and size ($Size_{i,t-1}$). Age refers to the time span from a hospital's founding year to the observation year. Since there are some missing values in the age variable, we adopt the impute procedure of Stata 8.1, and estimates the missing value of the organization's age with the organization's other characteristic variables, such as hospital ownership, hospital accreditation status, number of employees, physician numbers, outpatient numbers, number of beds, utilization of high technology medical equipment, categories of high technology medical equipment, and organizational positive performance experiences. Size is measured by the number of beds. The number of service specialties and types of high technology equipment reflects a hospital's structural complexity and in turns affects the chance of an organization to adopt innovation (Meyer and Goes, 1988).

Therefore, the study control for the number of service specialties ($Subjects_{i,t-1}$) and the number of categories of high technology medical equipment ($TechCategory_{i,t-1}$). Furthermore, the demand for new technology adoption affects the probability of new technology adoption (Provan, 1987) as well, so, the study control for the growth of a hospital's demand ($Grth_{i,t-1}$), and accreditation status ($Rank_{i,t-1}$). The growth of demand ($Grth_{i,t-1}$) is derived by dividing the increase in beds by the total number of beds in the previous year; accreditation status ($Rank_{i,t-1}$) has five ranks. 0 - failed or not receiving accreditation; 1 - district hospitals; 2 - regional hospitals; 3 - quasi-medical centers; 4 - medical centers. Past performance affects new technology adoption, so the study incorporate the utilization of high technology equipment ($Usage_{i,t-1}$), which is the total utilization of high technology equipment at a hospital in the previous year, to control for the effect of past performance. Ownership of a hospital also influences new technology adoption (Goes and Park, 1997). This variable ($Ownership_{i,t-1}$) is 0 if public and 1 if private.

Environmental variables such as market demand, influence a hospital's investment in new technology (Tsai and Lee, 2002); market demand is measured as population size in each geographical area ($Population_{i,t-1}$). Competition intensity and market concentration also affect a hospital's decision to adopt new technology (Gowrisankaran and Stavins, 2004) and is measured here ($Dense_{i,t-1}$) by the number of hospitals in a geographical area. Market concentration ($CR_{4\ i,t-1}$) is measured by the total market share of the four biggest hospitals that have the highest outpatient numbers (Dobrev et al., 2002) in a geographical area.

Statistical analysis method and estimation model

Since the unit of analysis for this study is hospital-year-equipment and some observation units are from the data of the same hospital across two years, the study adopts cross-sectional time series analysis with random effects, using Stata 8.1 statistical software to analyze the data. It incorporates high technology medical equipment categories into the study as a dummy variable to control estimated bias caused by autocorrelation, and the effects of unobserved heterogeneity.Data concerning high technology equipment quantity and performance before the observation period are unavailable, which may lead to an incorrect measurement of positive performance experience. To correct this left censor problem, we follow Henderson and Cool's (2003) approach and treat operational performance in the year 1999 (outpatient number in the year 1999, $Opd_{i,88}$) as the proxy index of an organization's experience by the year 1999, then add the interaction term of bandwagon effect and operational performance in the year 1999 ($Bandwagon_{i,j,t} \times Opd_{i,88}$). Finally, the study handles the multicollinearity problem using the regression multicollinearity diagnosis method suggested by Hamilton (1992). Because dependent variables are count variables, a Poisson regression model with random effect is adopted for statistical analysis. The estimation model is shown thus:

$NewAdoption_{i,j,t} = \alpha + \beta_1\ Bandwagon_{i,j,t} + \beta_2\ Bandwagon_{i,j,t} \times Positive\ Performance\ Experience_{i,t-1} + \beta_3 Bandwagon_{i,j,t} \times TechnologyInvestmentSimilarity_{i,t-1} + (\beta_4\ Population_{i,t-1} + \beta_5 CR_{4\ i,t-1} + \beta_6\ Dense_{i,t-1} + \beta_7\ Age_{i,t-1} + \beta_8\ TechCategory_{i,t-1} + \beta_9$

Table 1. Descriptive statistics and correlation coefficient.

No.	Variable	Mean	Std. dev.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	NewAdoption $_{i,j,t}$	0.02	0.15	1.00														
2	Population $_{i,t-1}$	1441031	933724.10	0.02	1.00													
3	$CR_{4\ i,t-1}$	0.56	0.16	0.00	-0.74	1.00												
4	Dense $_{i,t-1}$	32.44	15.91	0.01	0.74	-0.88	1.00											
5	Age $_{i,t-1}$	27.31	25.62	0.05	-0.06	0.11	-0.08	1.00										
6	TechCategory $_{i,t-1}$	1.06	1.82	0.08	0.13	-0.04	0.04	0.17	1.00									
7	Size$_{i,t-1}$	209.40	348.56	0.09	0.07	0.01	0.00	0.21	0.80	1.00								
8	Grth $_{i,t-1}$	0.04	0.53	0.02	-0.05	0.00	-0.05	-0.03	0.00	0.05	1.00							
9	Usage $_{i,t-1}$ [a]	3614.96	14091.7	0.05	0.08	-0.04	0.06	0.08	0.67	0.75	-0.01	1.00						
10	Subjects $_{i,t-1}$	7.93	6.68	0.10	0.14	0.02	-0.04	0.27	0.74	0.66	0.01	0.39	1.00					
11	Ownership $_{i,t-1}$	0.83	0.37	-0.03	0.08	-0.17	0.15	-0.39	-0.08	-0.23	-0.02	-0.10	-0.33	1.00				
12	Rank $_{i,t-1}$	1	0.81	0.10	0.10	-0.03	0.05	0.18	0.79	0.76	-0.02	0.65	0.67	-0.16	1.00			
13	Positive performance experience $_{i,t-1}$	1.23	2.2	0.10	0.05	0.00	0.01	0.17	0.80	0.76	0.04	0.64	0.59	-0.03	0.72	1.00		
14	Technology investment similarity $_{i,t-1}$	16.06	24.73	0.03	0.50	-0.39	0.32	0.08	0.38	0.22	-0.03	0.16	0.44	-0.03	0.30	0.16	1.00	
15	Bandwagon $_{i,j,t}$	0.36	0.72	0.18	0.22	-0.19	0.19	-0.01	0.05	0.04	0.00	0.06	0.06	0.02	0.04	0.01	0.16	1.00

a. Usage$_{i,t-1}$, which is the total utilization of technology equipment of a hospital in the previous year (unit:100,000).

Size $_{i,t-1}$ + β_{10} Grth $_{i,t-1}$ + β_{11} Usage$_{i,t-1}$ + β_{12}Subjects $_{i,t-1}$ + β_{13} Ownership $_{i,t-1}$ + β_{14} Rank $_{i,t-1}$ + β_{15} OPD $_{i,88}$ + β_{16} Positive Performance Experience $_{i,t-1}$ + β_{17} Technology Investment Similarity $_{i,t-1}$ + β_{18} Bandwagon$_{i,j,t}$×OPD$_{i,88}$) + $\varepsilon_{i,j,t}$

RESULTS

Table 1 presents means, standard deviations, and correlation coefficients of the variables in the estimation models. Correlation coefficients among some independent variables are high, but they do not result in multicollinearity. Variance inflation factors (VIF) of independent variables are all smaller than 10, below the criteria (20) for multicollinearity (Hamilton, 1992). Table 2 shows the result of the poisson regression model with random effect.

The dependent variable is the quantity of new high technology equipment. In the table, model 0 includes only control variables; model 1 adds the bandwagon effect to examine H_1; model 2 further adds interaction with positive performance experience to verify H_{2a} and H_{2b}; model 3 adds interaction with multipoint competition to examine H_{3a} and H_{3b}.

Bandwagon effects on new technology adoption

H_1 predicts that a hospital becomes more likely to invest in a specific type of new high technology as more of its peers invest in the technology. Table 2 exhibits the results of Poisson regression with random effects. As model 1 in Table 2 shows, the bandwagon effect has a positive influence on new technology adoption (coefficient= 1.15, p<.001). The incidence rate ratios (IRR) relative to non bandwagon effects is 3.16 ($e^{coefficient}$= $e^{1.15}$= 3.16), which means that the probability of investing in new technology equipment when the bandwagon effect is present is 3.16 times greater than when the bandwagon effect is not present. In addition, to increase the robustness of the analysis, the study uses a binary dependent variable: whether hospital *i* invested in new high technology equipment *j* in year *t* (1 = yes; 0 = no). Logistic regression with random effects exhibits the same results (coefficient= 1.31, p<.001). These results strongly support H_1.

Moderating effects of positive performance experience

H_{2a} and H_{2b} are competing hypotheses. H_{2a}

Table 2. Poisson regression with random effect analysis: The influence of bandwagon effect, positive performance experience, and strategy similarity on new technology adoption ($NewAdoption_{i,j,t}$).

Variable	Model 0					Model 1					Model 2					Model 3					Model 4				
Independent variable	β	SE	z	P>z		β	SE	z	P>z		β	SE	z	P>z		β	SE	z	P>z		β	SE	z	P>z	
Constant	-6.70	1.28	-5.25	0.00	***	-6.13	1.39	-4.42	0.00	***	-6.22	1.38	-4.50	0.00	***	-6.27	1.43	-4.40	0.00	***	-6.42	1.41	-4.56	0.00	***
$Population_{i,t-1}$	0.00	0.00	-0.72	0.47		0.00	0.00	-0.98	0.33		0.00	0.00	-0.88	0.38		0.00	0.00	-1.13	0.26		0.00	0.00	-1.00	0.32	
$CR4_{i,t-1}$	-0.12	1.39	-0.08	0.93		-0.48	1.51	-0.32	0.75		-0.32	1.51	-0.21	0.83		-0.50	1.56	-0.32	0.75		-0.18	1.54	-0.12	0.91	
$Dense_{i,t-1}$	0.01	0.01	0.54	0.59		-0.02	0.02	-1.30	0.20		-0.02	0.02	-1.40	0.16		-0.02	0.02	-1.45	0.15		-0.02	0.02	-1.41	0.16	
$Age_{i,t-1}$	0.00	0.00	0.75	0.46		0.00	0.00	0.93	0.35		0.00	0.00	1.01	0.32		0.00	0.00	0.90	0.37		0.00	0.00	0.95	0.34	
$TechCategory_{i,t-1}$	-0.27	0.08	-3.59	0.00	***	-0.27	0.08	-3.42	0.00	***	-0.29	0.08	-3.71	0.00	***	-0.28	0.08	-3.50	0.00	***	-0.30	0.08	-3.83	0.00	***
$Size_{i,t-1}$	0.00	0.00	0.33	0.74		0.00	0.00	0.47	0.64		0.00	0.00	0.47	0.64		0.00	0.00	0.47	0.64		0.00	0.00	0.58	0.56	
$Grth_{i,t-1}$	0.45	0.21	2.11	0.04	*	0.39	0.23	1.73	0.08	†	0.39	0.22	1.73	0.08	†	0.40	0.23	1.73	0.08	†	0.39	0.23	1.70	0.09	†
$Usage_{i,t-1}$	0.00	0.00	-0.82	0.41		0.00	0.00	-1.61	0.11		0.00	0.00	-1.51	0.13		0.00	0.00	-1.70	0.09	†	0.00	0.00	-1.56	0.12	
$Subjects_{i,t-1}$	0.15	0.02	6.24	0.00	***	0.13	0.02	5.79	0.00	***	0.12	0.02	5.27	0.00	***	0.14	0.02	5.87	0.00	***	0.12	0.02	5.32	0.00	***
$Ownership_{i,t-1}$	-0.01	0.24	-0.03	0.98		0.02	0.25	0.09	0.93		0.06	0.25	0.22	0.83		0.01	0.26	0.05	0.96		0.06	0.26	0.25	0.80	
$Rank_{i,t-1}$	0.29	0.17	1.71	0.09	†	0.42	0.18	2.38	0.02	*	0.39	0.18	2.21	0.03	*	0.39	0.18	2.18	0.03	*	0.35	0.18	1.95	0.05	*
$OPD_{i,88}$	0.00	0.00	1.33	0.18		0.00	0.00	0.57	0.57		0.00	0.00	1.51	0.13		0.00	0.00	0.69	0.49		0.00	0.00	1.29	0.20	
Positive Performance Experience $_{i,t-1}$	0.10	0.06	1.54	0.12		0.15	0.07	2.18	0.03	*	0.14	0.07	2.12	0.03	*	0.15	0.07	2.24	0.03	*	0.15	0.07	2.15	0.03	*
Technology Investment Similarity $_{i,t-1}$	0.00	0.00	-0.75	0.45		-0.01	0.00	-1.53	0.13		-0.01	0.00	-1.60	0.11		0.00	0.01	0.56	0.58		0.00	0.01	0.46	0.64	
$Bandwagon_{i,j,t} \times OPD_{i,88}$											0.00	0.00	-2.76	0.01	**						0.00	0.00	-2.23	0.03	*
H1: $Bandwagon_{i,j,t}$						1.15	0.08	14.94	0.00	***	1.19	0.11	11.06	0.00	***	1.35	0.11	12.06	0.00	***	1.32	0.12	10.83	0.00	***
H2: $Bandwagon_{i,j,t}$ ×Positive Performance Experience $_{i,t-1}$											0.05	0.02	2.05	0.04	*						0.06	0.03	2.34	0.02	*
H3: $Bandwagon_{i,j,t}$ ×Technology Investment Similarity $_{i,t-1}$																-0.01	0.00	-2.53	0.01	**	-0.01	0.00	-2.25	0.03	*
Wald chi2	147.29			0.00	***	393.35			0.00	***	401.69			0.00	***	379.69			0.00	***	398.12			0.00	***
Log likelihood	-782.34					-657.28					-653.22					-654.13					-650.71				

observation number=10490; All models also control for technology item (dummy variables); †p≤ 0.1.,* p≤ 0.05.,** p≤ 0.01.,*** p≤ 0.001.

predicts that positive performance experience will increase the bandwagon effect, while H_{2b} predicts that positive performance experience will reduce the bandwagon effect. As model 2 in Table 2 shows, positive performance experience significantly strengthens the positive impact of the bandwagon effect on new technology adoption, as predicted by H_{2a} (coefficient= 0.05, p<0.05). The incidence rate ratios (IRR) of different positive-performance experiences relative to non positive-performance experience: IRR (positive performance experience=1) is 1.05 and IRR (positive performance experience= 8) is 1.49. The results show that the more positive performance experience a hospital has, the stronger the bandwagon effect. In addition, logistic regression with random effects for the binary dependent variable also yields a similar result (coefficient= 0.07, p<.01). These results strongly support H_{2a}, while rejecting H_{2b}.

Moderating effects of Technology Investment Similarity

H_{3a} and H_{3b} are also competing hypotheses. H_{3a} predicts that technology investment similarity will strengthen the bandwagon effect, while H_{3b} predicts similarity will reduce the effect. Model 3 in Table 2 supports H_{3b} (coefficient= -0.01, p<.01), indicating that technology investment similarity weakens the bandwagon effect. The incidence rate ratios (IRR) of different levels of technology investment similarity relative to technology investment similarity=0: IRR (technology investment similarity = 16.06) is 0.85; and IRR (technology investment similarity = 82.67) is 0.44. The results suggest that higher technology investment similarity weakens the bandwagon's effects on new technology adoption. In addition, logistic regression with random effects for the binary dependent variable also yields similar result (coefficient= -0.01, p<.05). H_{3b} is strongly supported while H_{3a} is rejected.

DISCUSSION AND CONCLUSIONS

This study explores the relationship between the bandwagon effect and new technology adoption and how a firm's positive performance experience and technology investment similarity moderate the relationship. Results confirm that the bandwagon encourages firms to adopt new technology. In addition, positive performance experience strengthens the effect, while technology investment similarity weakens the effect. This study thus increases our understanding of how moderating factors can produce differing responses to the bandwagon effect.

The results confirm the explanatory power of the bandwagon effect on new technology adoption (Abrahamson and Rosenkopf, 1993). Facing highly uncertain decisions, organizations often refer to social factors such as peers' actions to make decisions. Peer adoption is a symbol of legitimacy, pushing the organization to follow the bandwagon, and take similar action (DiMaggio and Powell, 1983). Peer adoption also generates competitive pressure because the organization is afraid of its performance falling behind. Thus, the organization will follow the bandwagon to avoid performance lag (Scharfstein and Stein, 1990).

Empirical results show that positive performance experience strengthens the bandwagon effect for new technology adoption. Organizations with more positive performance experience are more likely to follow the bandwagon due to low alternative awareness (Sitkin, 1992; Miller and Chen, 1996; Fiol and O'Connor, 2003) and reputation maintenance (Dowling, 1986). Low awareness makes organizations attend to visible action plans and thus neglect possible alternatives. Consequently, organizations with positive performance experience tend to follow the bandwagon.

The competing hypothesis that positive performance experience weakens the bandwagon effect is not supported; this study did not find evidence that organizations with more positive performance experience were less likely to follow peers' actions. The study suggests two possible explanations for this. One explanation is that perceptions of the uncertainty in choosing new technologies to adopt may be too high. Positive performance would then be inadequate to overcome this uncertainty, allowing the bandwagon to continue to influence technology adoption decisions. Another possible explanation is in the social forces that shape technology decisions. Conformity to actions that are perceived as legitimized by industry knowledge or practice is common in the hospital industries (Westphal et al., 1997). This conformity to industry-wide practices may prevent a particular hospital's distinct needs or experiences from exerting much influence on high technology equipment investment decisions. Thus, even hospitals with positive performance experience still conform to bandwagon.

Technology investment similarity decreases the bandwagon effect for new technology adoption. Organizations with technology investment similar to their peers seek differentiation and avoid extreme competition, weakening the bandwagon effect. While high similarity brings shared cognition, this alone is not enough to push an organization to follow the bandwagon. Niche overlap is the primary factor influencing organizations' decisions to follow the bandwagon. For organizations with low technology investment similarity, their niches do not overlap. Thus, the bandwagon still has significant positive impact on their new technology adoption.

This study has two limitations. First, the study focuses only on decisions surrounding new technology adoption; it does not address growth decisions within organizations' extant technology domains. The conclusions are suitable only for entries into new fields. Second, the data collected covers only four years, due to lack of data availability. Examination on a longer time scale would provide more comprehensive observations of new technology adoption behavior.

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