

An Empirical Examination of the Use of Mobile Technology – A Social Pressure Perspective

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Abstract

Mobile technology has been predicted to create new challenges and competitions to organizations. To business decision makers, the understanding of mobile technology would then become critical in helping organizations to better manage relevant technological issues. The theoretical analysis and empirical examination of mobile phenomenon, however, remain scarce. In addition, conventional wisdom tends to emphasize the economic aspect of information technology. Such emphasis, nonetheless, lacks the explanatory power to understand social factors of the use of technologies. Social aspects of technologies could significantly influence the success of adoption. Derived from institutional theory, which emphasizes the influence of social pressures on collective members' isomorphic behavior, the paper proposes how three different social pressures—coercive, mimetic, and normative pressures would positively influence a group member's use of mobile technology. Our findings suggest that the influence of social pressures on the use of mobile technology might be contingent upon the types of technologies. While normative pressure is positively related to the use of cellular phones, coercive and mimetic pressures are significant to the use of laptops. Business decision makers might thus employ various strategies to create certain social pressure and in turn promote the use of corresponding mobile technologies.

1. Introduction

The need of studying mobile technology appears to be increasingly critical as its exponential development would be likely to present tremendous challenges and opportunities to individuals and organizations. As amazon.com CEO Jeff Bezos once asserted, "If you look five to ten years out, almost all of e-commerce will be on mobile devices" [19, p.74]. In line with his view, practitioners have predicted that the transaction of mobile hardware is expected to exceed 3.9 billion by 2006 [2]. In addition, the US market would have 171.1 million mobile Internet users by 2005 with 111 million consumers accessing mobile Web on a monthly basis [5]. Cell phones, for example, would become a 'retail outlet' in a customer's packet [9] [18] and would be the second highest potential advertising medium next to television [26]. More importantly, mobile technology would significantly change firms' business model [19] and

information technology (IT) strategy [7] [13] [15] [25].

However, the current understanding of mobile technology remains mostly at the conceptual level [e.g., 8, 20, 21, 23, 24]. Empirical studies that help to understand and manage mobile phenomenon appear inadequate. With rapid changes and competitions in the business world, such insufficient understanding of the mobile phenomenon might cause organizational and managerial inability to respond to, let alone to manage its technological impacts. It is thus critical to be more actively examining the mobile phenomena. In addition, traditional IT literature tends to investigate emerging technologies through the economic perspective [17]. While this perspective such as transaction cost economics helps explain the cost efficiency of technological adoption, it lacks the power to disclose social factors that drive IT usage behavior. Guided by institutional theory, the paper thus seeks to shed light on how social factors promote the use of mobile technologies. Specifically, we investigate the relationship between social pressures and the usage behavior of two mobile technologies—cell phone and laptop. The findings could help us better understand the rationale of IT usage behavior and further provide insights to business decision makers on the importance of considering social factors when marketing and managing mobile technologies.

2. Social Pressures and Mobile Technology

Institutional theorists argue that the rationale behind an actor's action is, not to increase cost benefits or efficiency, but to gain legitimacy [11]. To survive in a collective field, actors have to first obtain social recognition. Such social recognition could be gained through acting to accommodate collective expectations, regardless of efficiency or cost benefits [16]. In modern society, organizations often adopt similar structures because of the isomorphic pressures they face [12]. Hiring a Nobel Prize winner in a university, for example, does not justify the immediate cost effectiveness; investing in an expensive yet inefficient technology, similarly, might causes financial loss. Organizations, however, could tend to undertake such actions because they perceive the need to gain social recognition or legitimacy. Such a need is normally resulting from the fear to be different or to be left behind [1].

Abrahamson [1] argues that in the context of adoption of innovation, actors often imitate a fashion setter or an

“opinion leader” [14] because fashion setters possess certain power to inspire others to “trust their choices of technologies and to imitate them.” [p.596]. Consequently, actors would imitate other actors’ choice of an innovation “when it obtains from these adopters’ knowledge that reduces ambiguity about the innovation” [1, p.597]. In so doing, the actor would appear more legitimate as it confirms to “emergent norms that sanction these innovations” [1, p.597]. Such an action sometimes is derived from “bandwagon pressures”—“pressures to adopt an innovation that increase according to the number of other organizations that have already adopted it” [1, p. 597].

The pressures that drive an actor to imitate or follow other actors have been well articulated by DiMaggio and Powell [4]. They explain that actors would often move toward the same direction as others because of coercive, mimetic and normative pressures. Coercive pressure is a strong force implying an action that actors must undertake. Failing to undertake such an action could result in fatal failures. At the organizational level, such urgency is often created by governmental regulation, industrial standard [10] or the dominance of powerful organization [22]. At the individual or group level, coercive pressure emerges when individual actors fear to be left behind [1] or being excluded from a social group. In the context of individual use of mobile technology, it is likely that individual actors would sense the need to use mobile technology to ensure that they could compete with their peers and/or be embraced by a social group. As such, we hypothesize:

H1: Coercive pressures will positively correlate with the use of mobile technology

Mimetic pressure, on the other hand, is mainly derived from environmental and technological uncertainty. While facing such uncertainty, actors tend to model themselves after those who have been well established and recognized as a legitimate player in the group [4]. In line with this view, Rogers [14] indicates that opinion leaders often influence later adopters who possess less knowledge or information about an innovation. Abrahamson [1] further suggests that while facing uncertainty, actors often fear to be different. Therefore, they would simply follow the fashion setters or group leaders when adopting an innovation. Considering the emerging nature of mobile technology, individual actors would inevitably face the technological uncertainty. As such, mimetic pressure would emerge and drive individuals to model themselves after those who have regularly used mobile technology. In the context of college education where students often engage in social groups, it is very likely that their use of mobile technology would be influenced by opinion leaders in the group. As such, we hypothesize:

H2: Mimetic pressures will positively correlate with the use of mobile technology

Finally, normative pressure is associated with

professionalization—the process through which actors respond to the pressures that are caused by the exchange of information in a group [4]. The professionalization reveals the information regarding each individual’s action and in turn creates an inevitable comparison among group members. Such a comparison would create certain normative pressure to encourage individual actors to remain competitive by demonstrating similar capabilities as others’. In the context of mobile technology, an actor would then tend to adopt a mobile technology due to normative pressures generated through professionalization among group members. As such, we hypothesize:

H3: Normative pressures will positively correlate with the use of mobile technology

3. Methodology

A survey questionnaire was used for data collection and exploratory factor analysis and multiple regression analysis were used for data analysis. Multiple regression analysis suited our research purpose because it was appropriate for prediction and explanation with a single dependent variable and multiple independent variables [6]. The data was collected from six technology-related classes in the College of Technology at an urban university. Among 250 questionnaires distributed, a total number of 129 useful questionnaire responses were used for the analysis. The dependent variable, ‘the use of mobile technology’, was measured by ‘the frequency of usage’, which was the most widely used measure in the IT literature [3]. Specifically, students were asked to rate their frequency of usage from “do not use at all” to ‘use it several times a day’.

3.1 Factor analysis

To ensure construct validity, the initial 18 items of social pressures were selected through a two-step process suggested by Davis [3]. First, the items were derived from conceptual definitions of DiMaggio and Powell [4], and second, the items developed were then consulted with seven colleagues. Factor analysis with varimax rotation extracted four principle components whose eigenvalues were above 1.00. The scree test further confirmed the appropriateness of this extraction. A factor loading value of .50 was chosen as the criterion for selecting significant items [6]. The scale reliability with the item-total statistics helps finalize three remaining factors, which correspond to coercive, normative and mimetic pressures, respectively (see Table 1).

4. Results

While Table 2 and Table 3 demonstrate the descriptive statistics, Table 4 and Table 5 illustrate the three-step hierarchical regression analysis for the frequency of use of cell phones and laptops, respectively. The results indicate that only normative pressure is

significant at the level of 0.10 for the use of cell phones (Table 4) and that only coercive and mimetic pressures demonstrate significant relationships with the frequency of laptop usage (Table 5). As such, for the use of cell phones, only hypothesis 3 is supported while for the use of laptops, only hypothesis 1 and hypothesis 2 are supported.

Table 1: Results of factor analysis of social pressures

Variables	Factor Loadings After Varimax Rotation		
	Coercive Pressures	Normative Pressures	Mimetic Pressures
CP1	0.84	0.00	0.16
CP2	0.76	0.33	0.00
CP3	0.74	0.33	0.18
CP4	0.72	0.42	0.18
CP5	0.69	0.34	0.25
CP6	0.62	0.33	0.43
CP7	0.61	0.27	0.42
NP1	0.23	0.88	0.13
NP2	0.28	0.87	0.20
NP3	0.30	0.87	0.24
NP4	0.34	0.81	0.28
MP1	0.21	0.21	0.88
MP2	0.20	0.22	0.89
Eigenvalues	7.4	1.4	1.2
% of Variance	57.0	10.5	9.3
Cumulative % of Variance	57.0	67.5	76.8
Internal Consistency	0.91	0.95	0.89

5. Discussion and conclusion

Hypotheses argue that social pressures in general and coercive, normative and mimetic pressures in particular would influence the use of mobile technology. The findings indicate that the influences of these pressures on the use of mobile technology might be contingent upon the types of mobile technologies. While normative pressures are significant to the use of cell phone, coercive and mimetic pressures provide better explanation for the use of laptop. One reasonable explanation for the difference is the fact that cell phone is widely adopted among college students. The device itself is relatively less expensive compared to a laptop. Furthermore, since its features and functions are constantly evolving¹, users are more likely to perceive cell phones as fashionable devices. Normative pressures that mainly concerned the social fashion resulting from information exchanged among social groups, thus, would be more likely to influence students' use of cell phones.

¹ For example, many manufactures recently launched new types of cell phone that allow not just the Internet connection but also the function of a digital camera.

Laptops, in contrast, are not as popular as cell phones among college students². Unlike cell phones, which could be shown in front of group members almost all the time, the laptop is not as portable and its functions and features do not change as frequently. As such, the influence of fashion and social norms (normative pressures) could then be less significant. Furthermore, the laptop is substantially more costly than the cell phone. Users might then perceive it to be more work oriented with higher risk involved. They might adopt the laptop only when necessary. Those who possess a laptop might thus be perceived as being in an elite group. Owning a laptop thus could denote certain symbolic group memberships; in other words, lacking a laptop means the possibility of being excluded by such a group. Coercive pressures, thus, could emerge to promote the use of a laptop for obtaining social recognition in such an elite group. Finally, since the laptop's features are more static, its usage might be based more on individual needs than on social fashion. If someone perceives a high degree of mimetic pressures in the use of laptops, they might be less knowledgeable about the technology in general. Less knowledgeable people would then tend to consider there to be less need for using a laptop because it is more costly with higher risk. The lower the needs for using a laptop, the less likely they will be to adopt it. This might help explain the negative relationship between mimetic pressures and the use of laptops.

The findings suggest the practical relevance of stimulating different types of social pressures when designing and marketing various mobile technologies. For low cost, highly portable devices (e.g., cell phones), a marketing strategy that aims for the influence of social fashion might be more effective. In contrast, for task oriented, high cost equipments (e.g., laptops), a strategy that focuses on easing technological uncertainty and creating an elite image might be more practical.

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² As shown in Table 2 and Table 3, the sample size for each of mobile technology decreases from 408 for cell phones to 335 for laptops.

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Table 2: Descriptive statistics for cell phone usage

Variable	Means	s.d.	1	2	3	4
1. Frequency of cell phone usage	5.34	1.31				
2. Purpose of cell phone usage	2.71	0.48	0.40***			
3. Coercive pressures	1.99	1.20	-0.00	0.03*		
4. Normative pressures	2.57	1.69	-0.02	-0.09	0.64***	
5. Mimetic pressures	2.41	1.42	-0.06	-0.03	0.55***	0.49***

Note. $N = 408$. *** $p < 0.001$, ** $p < 0.01$, * $p < .05$. † $p < 0.10$.

Table 3: Descriptive statistics for laptop usage

Variable	Means	s.d.	1	2	3	4
1. Frequency of laptop usage	3.77	2.04				
2. Purpose of laptop usage	2.35	0.83	0.26***			
3. Coercive pressures	1.77	1.29	0.08†	0.08†		
4. Normative pressures	2.66	1.60	0.08†	0.12*	0.72***	
5. Mimetic pressures	2.03	1.41	-0.04	0.04	0.73***	0.63***

Note. $N = 335$. *** $p < 0.001$, ** $p < 0.01$, * $p < .05$. † $p < 0.10$.

Table 4: Results of hierarchical regression analysis for frequency of cell phone usage

Variable	Step 1	Step 2	Step 3
Step 1			
School year	0.08	0.16**	0.19***
Marital status	-0.15**	-0.07	-0.04
With/without children	0.07	0.07	0.04
Number of teenage children	-0.22*	-0.24**	-0.24**
Region of nationality	0.10†	0.00	0.01
Work hours	0.12*	0.07	0.05
Traveling hours	0.11*	0.13**	0.12*
Step 2			
Purpose of cell phone usage		0.41***	0.43***
Step 3			
Coercive pressures			-0.02
Normative pressures			0.12 †
Mimetic pressures			-0.09
R ²	0.09***	0.23***	0.24***
Adjusted R ²	0.07***	0.21***	0.22***
Δ R ²	0.09***	0.14***	0.01

Note. $N = 408$. Entries are standardized betas. † $p < .1$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 5: Results of hierarchical regression analysis for frequency of laptop usage

Variable	Step 1	Step 2	Step 3
Step 1			
School year	0.04	0.04	0.07
Marital status	-0.06	-0.04	-0.04
With/without children	0.01	0.06	0.03
Number of teenage children	0.12	0.16†	0.17†
Region of nationality	0.15**	0.13*	0.11†
Work hours	-0.05	-0.05	-0.04
Traveling hours	0.01	0.04	-0.01
Step 2			
Purpose of laptop usage		0.30***	0.28***
Step 3			
Coercive pressures			0.19*
Normative pressures			0.03
Mimetic pressures			-0.21*
R ²	0.04†	0.12***	0.14***
Adjusted R ²	0.02†	0.10***	0.11***
Δ R ²	0.04†	0.08***	0.02†

Note. $N = 335$. Entries are standardized betas. † $p < .1$. * $p < .05$. ** $p < .01$. *** $p < .001$.