The Growth of End User Innovators and Changing
Precedent Factors: A Case Study of the Comics Industry

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Abstract

In this study, we examine the motivation structure for individuals' consumption, purchase, and innovation behaviors. In particular, we divide innovation into three stages: privatized, publicized, and profitable innovation. These three stages are determined by whether individuals share their works with others and whether they obtain monetary rewards for selling their works. To examine this topic, we carry out an empirical survey focusing on the Japanese comics industry. We find that there are substantial differences in the motivation involved in the three stages. In privatized innovation, users are motivated by intrinsic pleasure. On the other hand, in publicized and profitable stages, the effect of pleasure becomes negative, while userness becomes a main precedent factor for creators. Our results suggest that firms and industry groups need to better understand users' internal changes in motivation, so that they can address related issues.

Keywords: user innovation, consumer behavior, content industry, information goods

1. Introduction

In the modern market, firms are often interested in the innovations of end users and consumers. Since many users become connected to interactive media on the Internet, they can easily transmit, receive, and share any content that they create. The transmission of content is no longer exclusively controlled by large organizations such as firms, industry groups, and governments, and much content is created and transmitted by consumers in a manner that is not connected to large organizations in any way, creating a large market.

In economic models, consumers, as end users, are seen as economic entities that exclusively consume products and services, while producers are economic entities that produce them. However, even long before the advent of the Internet, some users have been both producers and consumers. Toffler (1980) refers to these individuals as "prosumers," who innovate for themselves. These prosumers are characterized by a DIY ("do it yourself") approach, which is most evident in the home. Current prosumers can use the Internet to interact, thus acquiring easy access to the knowledge and innovations of others. Von Hippel (1996) and Chesbrough (2003) have reported the adoption of external innovations in a business-to-business market. In the recent years, end users have exchanged innovations through the Internet, and firms have utilized these innovations. Information goods are particularly easy to copy and transmit through the Internet, and users can share their content with others worldwide (Shapiro and Varian, 2000). In recent years, the objectives of innovation have shifted away from simply developing innovations and toward developing innovations that are adoptable by others.

As more innovative users appear, so do new businesses in the ICT (information communication technology) industry, such as YouTube and Twitter. For these businesses, user participation and content submission are vital to success. These firms provide only "empty boxes" for users, which they have to encourage users to fill. Some of these innovative users create particularly valuable content, while others are less valuable in this regard. Firms thus have to identify users' values and determine their motivations in order to encourage their creation.

However, many studies have focused only on the creation or innovation activities of users, without examining the value of created content. Furthermore, few studies have revealed the differences in motivations between users who create valuable content and those who do not. With this in mind, our research aims to classify three stages of innovation and examine the relationships between creative activity and motivations in the information goods industry.

2. User Innovations and Consumer Motivations

Research on innovative users has been carried out in a number of fields. In this section, we present an overview of relevant studies and propose research objectives based on a synthesis of previous findings.

2.1. User Innovation Studies

The concept of the lead user was originally proposed by von Hippel (1986), in a study based on von Hippel's (1976, 1977) earlier observations of innovative users who have more ideas for products than developers in the B-to-B (business-to-business) industry. Von Hippel (1986) defines lead users as having the following two properties:

(1) Lead users face needs that will be general in a marketplace——but face them months or years before the bulk of that marketplace encounters them.
(2) Lead users are positioned to benefit significantly by obtaining a solution to those needs.

Urban and von Hippel (1988) then empirically demonstrated the existence of lead users through cluster analysis. In the early years of research on lead users, they were mainly the subject of efficient market research, but user innovation studies also discussed how to adapt user innovations to firms' product development (e.g., von Hippel, 2001a; Ogawa, 1998; von Hippel, 2005). User innovation studies mainly focused on B-to-B industries, although some later studies addressed B-to-C (business-to-customer) industries (e.g., Franke and von Hippel, 2003; Franke and Shar, 2003; Jeppesen and Frederiksen, 2006). Von Hippel, Ogawa, and de Jong (2011) conducted a survey of end user innovation in the USA, the UK, and Japan, and their results suggested that millions of consumers acted as sources of innovation. Within the field of user innovation studies, many papers have demonstrated consumers' innovation activities.

To measure the "lead userness" of individuals, Morrison (1995) and Morrison, Roberts, and von Hippel (2000) have proposed a measurement scale that uses the LES (leading edge status), consisting of 7 measurement items, to measure lead userness. Morrison et al. (2000) have demonstrated that the reliability of the construct is good. Morrison, Roberts, and Midgley (2004) have also presented a distribution of LES scores. Morrison et al. (2000) focus on a library information system and the innovation behaviors of librarians; their findings suggest that librarians who have high LES scores tend to use the system proactively. In particular, they tend to communicate with vendors to express their needs or develop and configure the system. Jeppesen and Frederiksen (2006) have focused on a digital synthesizer product to show that high LES users tend to modify software.

2.2. Attitude of Users for a Certain Product Category

As mentioned above, many studies examine the behavioral aspects of innovative users in the field of innovation management. In contrast, in the field of consumer behavior, many studies focus on intrinsic motivation structures or processes. In this paper, we focus on involvement as a construct

that controls behaviors concerning or attitudes toward specific product or service categories.

The concept of involvement was first addressed in terms of "ego-involvement" by Sherif and Cantril (1947) and Sherif and Hovland (1961) within the field of social psychology. In these early years, the concept of involvement was typically applied to examine responses to advertisements (Krugman, 1965). Since there are many types of involvement, Mitchell (1981), Park and Mittal (1985), and Laaksonen (1994) have tried to classify them. According to Peter and Olson (2010), involvement can be classified into two groups: situational and enduring involvement. Enduring involvement is deeply related to the attitudes of consumers toward a certain product category or industry. Higie and Feick (1989) argue that enduring involvement is a factor that affects individual attitudes to and behaviors concerning a product. In addition, they explain that enduring involvement is intrinsically motivated by consumers' experiences of self-image and the delight given by an objective product.

Many studies indicate that involvement, and especially enduring involvement, affects consumption behavior with regard to objective product categories such as the size of consideration or reject sets of consumers (Divine and Page, 1994; Brisoux and Cheron, 1990), routes of information processing (Petty and Cacioxoo, 1986), and entire information processing behaviors (Peter and Olson, 2010). In this study, we find that consumers with high involvement actively search for information on products and, as a result, tend to have higher levels of consumption.

Involvement affects more than consumption; some empirical studies indicate that a relationship exists between involvement and other behaviors. For example, Ichikohji and Katsumata (2013) show that content generators tend to have high levels of involvement, while Chang and Chung (2011) indicate that involvement affects information sharing on the Internet. These studies imply that involvement affects consumers' entire behaviors related to an objective product.

Higie and Feick (1989) also show that that enduring involvement, which affects the motivation to relate to certain products, contains two sub-constructs, the "hedonic" factor and the "self-expression" factor. Some previous studies, such as those of Zaichkowsky (1985) and McQuarrie and Munson (1987, 1991) also imply that there are two different sub-constructs of enduring involvement. Higie and Feick (1989) examine the relationship between these two sub-constructs and particular items. They argue that the hedonic factor measures the degree to which a product is related to one's pleasure, while the self-expression factor measures a product's relationship to one's identity. These two factors may affect users' behaviors and attitudes in different ways. Therefore, in this study, we divide enduring involvement into these two sub-constructs to examine the structure of motivation.

2.3. Research Objectives

We define the objectives of this paper based on the previous studies of user innovation behavior

and consumer motivation that are described above. The purpose of this study is to examine the relationships between generation/consumption behavior and the intrinsic motivations of users. In it, we focus on the motivation structure of users who generate content. We aim to reveal the precedent factors for generating valuable content that can be exchanged for money in the market. Using a similar approach, Ghose and Han (2011) have empirically analyzed the information transmission and reception of users. In contrast, we focus on the quality or market value of generated information.

In addition, we examine the effects of users' individual characteristics, such as lead userness and involvement level, on their generation and consumption behaviors. In generation behavior, the motivation structure for generating valuable content may be different from that for generating non-valuable content. As Deci (1975) indicates, monetary rewards may alter the motivation structure involved in content generation.

In the next section, we define the objective variables of generation and consumption and propose our hypotheses.

3. Research Design and Hypotheses

3.1. Definition of Objective Variables

In this study, we focus on users' behavioral aspects in both consumption and innovation (content generation). We divide consumption and innovation behaviors into two and three aspects (respectively) and examine the relationships between them.

First, we divide consumption into frequency of use and purchase amount. In the content market, many users do not pay for their content. Although they are still consumers, they do not contribute to the profits of firms. With this in mind, we examine the structural differences between these non-valuable consumers and valuable consumers. Table 1 provides a more detailed description of user aspects.

Table 1: The two aspects of users

Classification	Profitability	
Frequency of Use	Non-profitable	Degree of activeness in using content, which includes free content use.
Purchase Amount	Profitable	Degree of activeness in purchasing content.

We divide innovation behavior into three stages, based on a study by Katsumata and Ichikohji (2011) that defines the stages of creation of innovative consumers. The first stage is that of "privatized innovators," who develop innovations to solve their individual problems that are exclusively used by them. This is also one of the characteristics of the "prosumers" proposed by

Toffler and Toffler (2007). The second stage is that of "publicized innovators," who develop innovations and share their outcomes with other users, as has been reported by von Hippel (2005) and other user innovation studies. The third stage is that of "profitable innovators," who obtain monetary rewards from other users by selling their outcomes. In terms of use and purchase behaviors, we also assume that profitable innovators develop privatized and publicized innovations. In other words, the three stages of innovation are not exclusive. Table 2 presents a summary of the three stages of innovation.

Table 2: The 3 classifications of end user innovation

Classification	Profitability	Socialization	
Privatized innovation	Non-profitable	Non-socialized	Develop innovation for their own purposes and use them by themselves.
Publicized innovation		Socialized	Share innovations that they develop with other users but do not receive any monetary rewards.
Profitable innovation	Profitable		Develop innovations and receive monetary rewards for sharing them with other users.

3.2. Hypotheses

In this section, we present our hypotheses on the relationship between intrinsic constructs and behavioral aspects. First, as many studies indicate (e.g., Peter and Olson, 2010), we hypothesize the effect of enduring involvement on consumption behavior as follows:

H1: There is a positive relationship between enduring involvement and consumption behavior.

Second, we formulate the relationship between enduring involvement and lead userness. Users who are characterized by high involvement actively search for information, and so may recognize new problems and needs earlier than low-involvement users. According to Higie and Feick (1989), users who have high enduring involvement want to relate to objective products. Therefore, we can expect that they also have high lead userness, as shown in Katsumata and Ichikohji (2011), and thus hypothesize the following:

H2: There is a positive relationship between enduring involvement and lead userness.

Next, we formulate the relationship between consumption behavior and lead userness. In

general, lead users are also frequent users (Morrison et al., 2000; Jeppesen and Frederiksen, 2006). We can expect that these users have greater knowledge of objective products and therefore hypothesize the following:

H3: There is a positive relationship between consumption behavior and lead userness.

The enduring involvement construct has already been applied to consumption behavior issues, but as Katsumata and Ichikohji (2011) indicate, this construct also affects innovation behavior. Therefore, we hypothesize the following:

H4: There is a positive relationship between enduring involvement and innovative behavior.

As user innovation studies show (Morrison et al., 2000a; Jeppesen and Frederiksen, 2006), lead userness plays a vital role in innovation behavior. The construct of lead userness includes both motivation and capability to innovate. As such, we propose the following hypothesis:

*H5: There is a positive relationship between lead userness and innovation behavior.*

In addition, we expect that users gradually step up their innovation. Thus, we offer the following hypothesis:

H6: Innovation behavior gradually moves from the privatized to the publicized and then to the profitable stage.

We also expect that the direct effect of moving from privatized to profitable innovation is not significant or is smaller than the effect of moving from publicized to profitable innovation.

This paper examines the above six hypotheses. However, we have defined consumption behavior as having two different aspects and innovation as comprising three stages. Therefore, we have to examine the relationships between these aspects and stages. Also, since we can expect that consumption and innovation behaviors are correlated with each other, we assume that correlations between them exist. Figure 1 depicts a rough structure of our model.

Figure 1: Rough Description of the Model
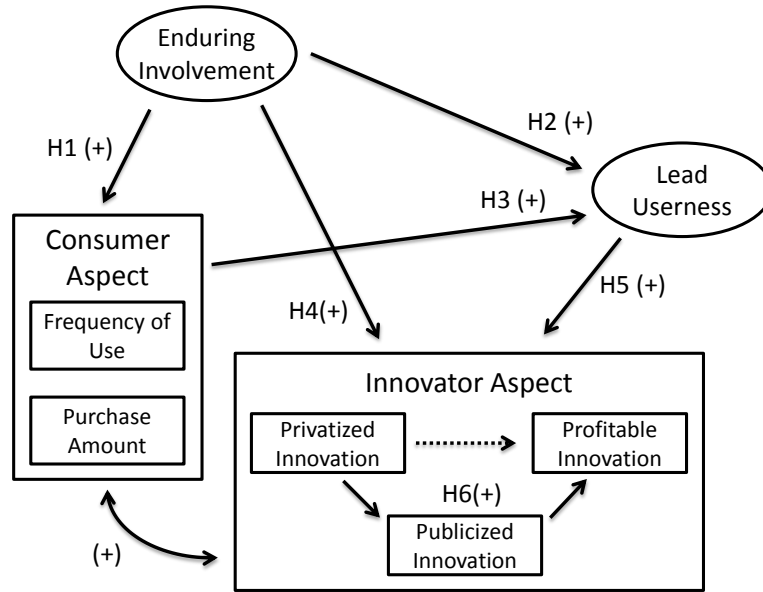
Expected relationships are shown in the brackets

In addition, as Higie and Feick (1989) have mentioned, the enduring involvement construct can be divided into two sub-constructs. Therefore, we estimate and compare the following two models: the first (Model 1) assumes one involvement construct, while the second (Model 2) assumes two involvement constructs. Table 2 shows the corresponding relationships between hypotheses and paths. In this table, lead userness is referred to as "LES," while enduring involvement is referred to as "EIS," after the names of the measurements. In Model 2, EIS is divided into EIS (hedonic) and EIS (self-expression).

In the next section, we describe our process of data collection.

Table 3: Models and summary of hypotheses

				Model 1: One-Factor Model				Model 2: Two-Factor Model			
H1		←	Involvement	H1a	Consumption	←	EIS	H1a	Consumption	←	EIS (Hedonic)
				H1b	Purchase	←	EIS	H1b	Purchase	←	EIS (Hedonic)
								H1c	Use	←	EIS (Self-Expression)
								H1d	Purchase	←	EIS (Self-Expression)
H2	LU	←	Involvement	H2	LES	←	EIS	H2a	LES	←	EIS (Hedonic)
								H2b	LES	←	EIS (Self-Expression)
H3	LU	←	Usage	H3a	LES	←	Consumption	H3a	LES	←	Consumption
				H3b	LES	←	Purchase	H3b	LES	←	Purchase
H4	Innovation	←	Involvement	H4a	Privatized	←	EIS	H4a	Privatized	←	EIS (Hedonic)
				H4b	Publicized	←	EIS	H4b	Publicized	←	EIS (Hedonic)
				H4b	Profitable	←	EIS	H4b	Profitable	←	EIS (Hedonic)
								H4c	Privatized	←	EIS (Self Expression)
								H4c	Publicized	←	EIS (Self Expression)
								H4d	Profitable	←	EIS (Self Expression)
H5	Innovation	←	LU	H5a	Privatized	←	LES	H5a	Privatized	←	LES
				H5a	Publicized	←	LES	H5a	Publicized	←	LES
				H5b	Profitable	←	LES	H5b	Profitable	←	LES
H6	Innovation	←	Innovation	H6a	Publicized	←	Privatized	H6a	Publicized	←	Privatized
				H6b	Profitable	←	Privatized	H6b	Profitable	←	Privatized
				H6c	Profitable	←	Publicized	H6c	Profitable	←	Publicized

Note: LU = Lead Userness, LES = Leading Edge Status, EIS = Enduring Involvement Scale

4. Empirical Analysis

4.1. Object Industry

In this study, we focus on the Japanese comics (manga) industry. Since there are many active innovative users in the comics industry, it is a suitable focus for examining the research objective. In addition, it has the following useful features.

First, the market size of the comics industry is larger than those of other content industries. In Japan, the market volume of the comics industry in 2012 was 376 billion yen (The All Japan Magazine and Book Publisher's and Editor's Association, 2013). Although the size of the comics market is gradually decreasing with the increase in digital media, its volume is still large. In addition, as Aoyama and Izushi (2003) have explained, the Japanese comics industry has a substantial effect on other content industries, such as the TV animation, TV drama, movie, and video game industries. Since comics have a large derivative market, the value of the comics content industry is larger than

its market size. For example, in the 2012 movie market, six of the top 10 Japanese movies (in terms of box-office sales) were based on comics works. Their box office sales accounted for 67% of the total sales of the top 10 Japanese movies (31 billion yen). Aoyama and Izushi (2003) call the comics industry the "creative foundation" of Japanese content industries, and comic works play a vital role even in neighbor industries, which the Japanese government has recently been supporting. The "Cool Japan" initiative, planned by the MIETI (Ministry of Economy, Trade, and Industry) aims to dramatically increase the spread of Japanese creative products on a worldwide scale.[1] The comics industry is one of the initiative's focus industries.

The second useful feature of the Japanese comics industry is that it includes large amateur markets and many amateur distributors. One of the most famous distribution events is the "Dojin-Shi Sokubai Kai," at which fan art and amateur works are sold. Some of these distribution events are very large. For example, at the "Comic Market," or "Comiket," the largest event in Japan, over 30,000 amateur groups sell their own works, and over 500,000 buyers visit the three-day event.[2] Amateur works are also available in bookstores that deal exclusively in these non-commercial works. Since these bookstores have e-commerce sites, consumers are able to purchase their comics through the Web, even if they live far from a bookstore. These prepared events and other means of distribution encourage amateur comic artists, and many professional comic artists get their start as sellers at events. In recent years, amateur artists have also begun uploading their comics and movies through applications such as pixiv, an image sharing SNS, and nico-nico doga, a movie sharing site. The number of visitors to nico-nico doga make it the 12th most visited in Japan (and the 111th worldwide), while pixiv is the 28th in Japan (and the 402nd worldwide), according to Alexa.com.[3]

We have chosen the comics industry as an objective case because of (1) its market size and the effect of neighbor markets, and (2) its organized amateur distribution channels.

4.2. Measurement of Behavioral Variables

In this section, we explain our measurement of behavioral variables in detail.

4.2.1. Usage

To measure usage variables, we asked questions on usage and then summarized the items.

We measured consumption with two items: "frequency of reading comic books," and "frequency of reading comic magazines," because comic books and magazines are the two major distribution forms in the comics industry. In addition, we asked respondents to indicate whether the comic books and magazines they read included those borrowed from friends, because many comics

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[1] Ministry of Economy, Trade, and Industry's "Cool Japan/Creative Industries Policy"
(http://www.meti.go.jp/english/policy/mono_info_service/creative_industries/creative_industries.html, retrieved on Dec, 18, 2013)
[2] The Official Comic Market Site (http://www.comiket.co.jp/, retrieved on Feb. 22, 2013)
[3] Alexa (http://www.alexa.com/, retrieved on Feb. 22, 2013)

consumers, especially young ones, frequently lend comic books to and borrow them from each other. Furthermore, we asked about the "frequency of viewing comics and illustrations on the web" to measure activity related to comics on the Internet. These three questions were measured in terms of frequency on an 11-point scale. We obtained data for an overall consumption variable in terms of standardized values. The details of the items and anchors are listed in the appendix.

Just as with our questions on frequency of consumption, we asked about "purchase amount of comic books" and "purchase amount of comic magazines" to measure purchase behavior. In the Japanese comics industry, comic magazines are commonly sold for 200-400 yen and comic books are sold for 400-500 yen. Therefore, we can roughly estimate the monetary value of a user's comics purchases from the number of purchases. In addition, we asked about "purchase amount of fan publications." Although it is not possible to purchase fan publications in ordinary bookstores, some consumers purchase them through the amateur market or the Internet. Generally, fan publications sell for 500 yen. Some experimental studies and previous surveys have implied that the market size of paid internet distribution is small (The All Japan Magazine and Book Publisher's and Editor's Association, 2013). Therefore, we did not ask about the purchase amount of internet comics. Our purchase volume variable was obtained from the aforementioned three measurements just as the consumption variable was based on three measurements. The items and anchors are also listed in the appendix.

4.2.2. Innovation behavior

Our measurements of innovation behavior were based on the three-stage innovation process described in the previous section.

First, to measure their degree of privatized innovation, we asked respondents about comics and illustration innovation activities. We asked them "do you draw comics/illustrations for yourself?" to which they responded "yes" or "no." We obtained 0- , 1- , and 2-point scores for privatized innovation by summing up the two measures.

Next, to measure respondents' degree of publicized innovation, we asked them whether they shared comics or illustrations that they drew through the Internet or in other traditional media, such as paper, CDs, and DVDs. There were four questionnaire items, for what the respondents shared (comics or illustrations) and how they shared it (through the Internet or through other traditional media). Items could be answered with a "yes" or "no," and we obtained a 0 to 4 score on publicized innovation by summing up the four measures.

Finally, to measure profitable innovation, we asked whether users sold their own works and whether they received enough revenue to have a surplus. As with the items on publicized innovation, since we asked about both comics and illustrations, there were four questionnaire items. For each item, we collected "yes" or "no" answers. Therefore, we were able to obtain a 0 to 4 score for

profitable innovation by summing up the four measures.

In our analysis, we standardized these three variables and estimated the coefficients. All items are listed in the appendix.

4.3.   Measurement of Lead Userness and Involvement

In this study, we measure the two constructs of lead userness and involvement. To measure lead userness, we adopted the LES, consisting of seven items, as proposed by Morrison et al. (2000). We collected answers with a 5-point Likert scale. We also employed the EIS, as proposed by Higie and Feick (1989), to measure the enduring involvement construct. The EIS consists of 10 items, and we collected answers with a 5-point Likert scale.

5.   Results

5.1.   Data Collection

We collected data from February 15 to 17, 2013, through an internet survey. The 1,747 respondents in our sample were all under 40 years old.

The reliability coefficients for our constructs are as follows: LES is $\alpha = 0.97$ (six items, with the last item omitted), and one-factor EIS is $\alpha = 0.94$ (10 items). In EIS, to check the number of factors, we calculated the eigenvalues of the correlation matrix. From the matrix, we got two eigenvalues above one; therefore, it was reasonable to assume that there were two factors involved. From the two-dimensional exploratory factor analysis, we found that the first "hedonic" factor was contributed to by the first to fifth item, and the second "self-expression" factor was contributed to by the seventh to tenth item. This corresponds to the results of Higie and Feick (1989). Since the sixth item was not contributed to by either factor, we omitted it. As a result, we obtained results on the hedonic factor from the first to fifth item and results on the self-expression factor from the seventh to tenth item. The Cronbach's alpha coefficients for the hedonic factor and self-expression factor were $\alpha = 0.97$ and $\alpha = 0.94$, respectively.

5.2.   Model Comparison

First, we compared the results for the one-factor involvement model (Model 1) and the two-factor involvement model (Model 2). We compared the RMR, GFI, RMSE, AIC, and BIC obtained from the estimation results. Table 4 shows that the indicators of Model 2 were better than those of Model 1. In Model 1, RMR, GFI, and RMSE are not high (low) enough, while in Model 2, these indicators exceed the threshold value. Furthermore, AIC and BIC show that Model 2 is better than Model 1. Therefore, in the following sections, we examine the results obtained from Model 2.

Table 4: Comparison of model fitness indicators

	Model 1	Model 2
	One-factor involvement model	Two-factor involvement model
RMR	0.234	**0.068**
GFI	0.669	**0.905**
RMSE	0.165	**0.078**
AIC	7,578.5	1,849.0
BIC	7,884.6	2,193.3
N	1747	

Note: Values are bold if RMR and RMSE < 0.1 or GFI > 0.9.

5.3. Test of Hypotheses

Table 5 shows the results of Model 2, which we used to test our hypotheses.

The first hypothesis, H1, addresses the effect of involvement on consumption behaviors. Since there are two usage variables and two involvement factors, we divide the hypothesis into four sub-hypotheses. From table 4, we find that both hedonic and self-expression involvement factors positively affect consumption and purchase amount. The coefficients of hedonic involvement for consumption behaviors are larger than those for self-expression. Thus, hypotheses H1a to H1d are supported.

H2a and H2b concern the relationships between involvement and LES. We find that these two factors have opposite directions. The self-expression factor positively affects LES, while the hedonic factor negatively affects it. The negative affect of the hedonic factor is significant, at less than the 1% level. These results support H2b, but reject the validity of H2a. This implies that a user who feels only pleasure from a product will not become an innovator. It is also in line with von Hippel's (1986) findings that a user's dissatisfaction or problem recognition concerning a product encourages innovation.

We examine the effect of usage behavior on LES in H3. Table 5 shows our findings that both consumption and purchase behavior positively affect LES. Users who actively create user content tend to have high LES. This supports both H3a and H3b. Furthermore, we find that purchase's coefficient value to LES is larger than that of consumption.

Our results concerning H4, which addresses the relationship between involvement factors and innovation behavior, are relatively complex. First, we find that only H4a, which concerns the hedonic factor in privatized innovation, is significantly positive. Hypotheses on the relationships between the hedonic factor and publicized and profitable innovation are significantly negative. On the other hand, we find that the self-expression factor does not affect any innovation behaviors.

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Therefore, we find that only H4a is supported. In section 5.4, we discuss the indirect effect of the self-expression factor in more detail. In addition, we further examine the negative effect in the discussion section.

The effects of LES on the three stages of innovation behaviors are all positively significant. This supports hypotheses H5a to H5c. However, the effects of privatized and publicized innovation are significant at the 10% level, while publicized innovation is significant at the 5% level. This implies that LES's main role is as a precedent of profitable innovation.

Finally, we tested the hypotheses for staged innovation growth. We found that the paths from privatized to publicized innovation and publicized to profitable innovation are positively significant, but could not find a significant relationship between privatized and profitable innovation. This result shows that users gradually move through the three innovation stages, which fully supports H6.

Table 5: Estimated parameters

Model 2: Two-factor model					Estimate	Std. Est.	Std. Err.	t-value	
H1	H1a	Consumption	←	EI (Hedonic)	0.312	0.433	0.018	16.92	***
	H1b	Purchase	←	EI (Hedonic)	0.170	0.236	0.019	8.80	***
	H2c	Consumption	←	EI (Self-Expression)	0.041	0.054	0.019	2.13	**
	H2d	Purchase	←	EI (Self-Expression)	0.110	0.146	0.020	5.45	***
H2	H2a	LES	←	EI (Hedonic)	-0.154	-0.245	0.018	-8.63	***
	H2b	LES	←	EI (Self-Expression)	0.254	0.387	0.018	14.37	***
H3	H3a	LES	←	Consumption	0.061	0.070	0.030	2.05	**
	H3b	LES	←	Purchase	0.201	0.231	0.028	7.20	***
H4	H4a	Privatized	←	EI (Hedonic)	0.101	0.140	0.020	4.94	***
	H4b	Publicized	←	EI (Hedonic)	-0.081	-0.113	0.017	-4.79	***
	H4c	Profitable	←	EI (Hedonic)	-0.066	-0.091	0.016	-4.19	***
	H4d	Privatized	←	EI (Self-Expression)	-0.001	-0.001	0.023	-0.02	
	H4e	Publicized	←	EI (Self-Expression)	0.028	0.037	0.019	1.46	
	H4f	Profitable	←	EI (Self-Expression)	0.016	0.022	0.017	0.93	
H5	H5a	Privatized	←	LES	0.049	0.042	0.030	1.65	*
	H5b	Publicized	←	LES	0.046	0.040	0.025	1.82	*
	H5c	Profitable	←	LES	0.049	0.042	0.024	2.07	**
H6	H6a	Publicized	←	Privatized	0.574	0.574	0.020	28.91	***
	H6b	Profitable	←	Privatized	-0.005	-0.005	0.022	-0.22	
	H6c	Profitable	←	Profitable	0.652	0.652	0.022	29.67	***

Note: Std. Est. = Standardized Estimates, Std. Err. = Standard Error, * = $p < 0.1$, ** = $p < 0.05$, *** = $p < 0.01$

In summary, the LES directly encourages innovation behaviors. The LES directly affects three innovation behaviors as a precedent-encouraging factor. Although the hedonic factor positively affects privatized innovation, its effect on profitable innovation is negative. Usage behaviors affect the LES positively. In particular, the effect of purchase amount is larger than the frequency of consumption. In involvement, the effects of hedonic and self-expression factors on the LES are opposite to each other.

5.4. Indirect Effects

In this section, we examine the indirect effects of involvement factors on innovation behaviors through the LES. To test indirect effects, Sobel (1982) proposes a procedure of statistic examination. Based on Sobel's approach, Baron and Kenney (1986) and Mallinckrodt et al. (2006) also examine methods for testing indirect effects. We apply these methods to test indirect effects. As Mallinckrodt et al. (2006) mentions, the results of measurements of indirect effects are not reliable when the sample involved is small. However, since the sample in this study involves more than 1,700 respondents, we were able to obtain reliable results.

Table 6 shows the results on indirect effects. We find that the indirect effects of the hedonic factor on innovation behaviors are negative. In contrast, the indirect effects of the self-expression factor on innovation behaviors are positive. Although we cannot observe the direct effects of the self-expression factor, this factor indirectly affects innovations via the LES.

Table 6: Indirect effects

					Estimate	Std. Est.	Std. Err.	z-value	Prob.	
Privatized	←	LES	←	EI (Hedonic)	-0.0075	-0.0103	0.0047	-2.17	0.030	**
Publicized	←	LES	←	EI (Hedonic)	-0.0071	-0.0098	0.0040	-2.47	0.013	**
Profitable	←	LES	←	EI (Hedonic)	-0.0075	-0.0103	0.0038	-2.69	0.007	***
Privatized	←	LES	←	EI (Self-expression)	0.0124	0.0163	0.0077	2.11	0.035	**
Publicizes	←	LES	←	EI (Self-expression)	0.0117	0.0155	0.0064	2.41	0.016	**
Profitable	←	LES	←	EI (Self-expression)	0.0124	0.0163	0.0062	2.63	0.008	***

Note: Std. Est. = Standardized Estimates, Std. Err. = Standard Error, $* = p < 0.1$, $** = p < 0.05$, $*** = p < 0.01$

In this study, we initially expected that involvement would be a direct source of motivation, but our results show different relationships. In particular, we find that the self-expression factor does not directly affect innovations. We assume that this result is caused by the characteristics of comics production. In the Japanese comics industry, comics are mainly drawn by a single person; therefore,

a certain level of drawing and construction technique is needed by comics artists. Some users do not have enough skills, even if they have high levels of involvement with comics.

6.   Discussion

6.1.   Rewards and Innovations

Our findings show that there are substantial differences among the motivation structures of privatized, publicized, and profitable innovation. This is particularly true for the effects of the hedonic factor, which is a sub-construct of enduring involvement but moves in a direction opposite to its effects. In this section, we discuss the background of our results.

First, the difference between pleasure (hedonic factor) and dissatisfaction (problem recognition) is important. In the consumer information processing model (e.g., Bettman, 1979; Blackwell, Miniard, and Engel, 2010), the first step in a behavior is "problem (or need) recognition." Consumers recognize the gap between an ideal and actual state and try to fill it. In our study, innovative users seem to face similar problems or needs. This causality fits in with the first definition of a lead user proposed by von Hippel (1986). Consumers who have high hedonic factor scores do not feel any problems or needs in the comic industry, and therefore do not tend to create. The exception to this is that the hedonic factor positively affects privatized innovation. Although, we have to examine this result in further detail, private drawings are only for the pleasure of users. If they feel any dissatisfaction, they can publicize their own solutions, in the form of their own comics. Dissatisfaction with the present state of an industry is one of the motivations of innovation, especially in the socialized stage, in forms such as publicized and profitable innovation.

Second, it should be kept in mind that there are differences among the rewards of privatized, publicized, and profitable innovation. Users do not receive monetary rewards for the first two stages of innovation but do for the third stage. Deci (1975) discusses how intrinsic motivation tends to be controlled by more concrete extrinsic motivations such as money. Generally, this change of motivation is irreversible. This implies that, at first, users' private generation is motivated by intrinsic factors such as involvement, which is mainly a hedonic factor, but that, once they begin sharing their works and gaining recognition from other consumers, their motivations shift toward peer recognition and away from intrinsic motivation. At the profitable stage, monetary rewards become a central motivation, making intrinsic motivation unnecessary. It should be noted that, since the shift in motivation is irreversible, users who are at the profitable stage have to receive monetary rewards to continue to generate content.

6.2.   The Role of the Publication Stage

In information industries, and especially content industries, user-generated content plays a vital role in supporting the market. In these industries, firms have to find new creators among the

consumers of content. Some innovative consumers become professionals, and their products are sold through commercial distribution. Firms have to deal with consumers not only for monetary income but also in order to foster the development of new creators.

To maintain this reproduction system, the publication (sharing) stage is especially important. As shown by the results of H6, users gradually move through innovation stages. Privatized innovators do not directly become profitable innovators but do so via a stage in which they are publicized innovators. The comics industry has long featured many means of amateur distribution, but publishing an amateur comic book is difficult for low-level innovative users. Recently, as a middle stage, many users upload their works free on the Internet. These means of sharing are important contact points that allow them to obtain feedback from readers. Based on comments and evaluations of their work, innovative users are able to understand the needs of the market. Innovative users become market-oriented by sharing their innovations and communicating with other users. All innovative users can access Internet distribution systems from anywhere, which encourages future professional creators. Some papers in the field of user innovation mention that toolkits and information-sharing communities encourage user innovation (e.g., Jeppesen, 2005; von Hippel, 2001a; von Hippel and Katz, 2002). Through the middle stage, users can easily achieve their purposes, which maintains their levels of motivation.

7. Conclusion

In this study, we examine the usage and innovation behaviors of end users in the information industry. We divide usage and innovation into two aspects and three stages, respectively, and propose a model of user behavior. Based on this model, we examine differences in the motivation structures of non-profitable and profitable innovation. Our study has made contributions to the existing literature and raised the following issues for future exploration.

The first contribution of our study is its findings on the relationships between the innovation behaviors and usage behaviors of consumers/users. Users are basically economic entities who pay money in exchange for products provided by firms. In our research, we focus on content generation (not only for consumption) and propose a comprehensive model of user behavior. Although, in this study, we discuss the comics industry, our findings are applicable to other industries. Future research should apply the model to other industries, such as the software development or music industries, and examine any points of difference.

The second contribution of our work is that it reveals the motivation structure involved in both usage and innovation behaviors among users. Previous studies have focused on lead userness and its precedent factors. However, our research incorporates the involvement construct to examine further intrinsic properties of users. In particular, we divide enduring involvement into two sub-constructs, hedonic and self-expression factors, and find many beneficial implications. This also allows us to

demonstrate substantial changes in motivation structures as users grow through innovation stages. In the future, we need to further consider precedent factors and transitions in motivation as innovative users step up, as well as our measurement scales and model.

Appendix: Measures

Table A1. Measures of usage behaviors

Items	Anchors
Consumption	
How many comic magazines do you read in a month?	1) Never; 2) 1; 3) 2; 4) 3; 5) 4; 6) 5; 7) 6 to 10;
How many comic books do you read in a month?	8) 11 to 30; 9) 21 to 50; 10) 51 to 100; 11) Over 101
How often do you browse illustrations and comics on the Internet?	1) Never; 2) Less than once a year; 3) Several times a year; 4) Once a month; 5) Several times a month; 6) Once a week; 7) Several times a week; 8) Once a day; 9) Several times a day; 10) More than 10 times a day
Purchase	
How many manga magazines do you purchase in a month?	1) Never; 2) 1; 3) 2; 4) 3; 5) 4; 6) 5; 7) 6 to 10; 8) 11 to 30; 9) 21 to 50; 10) 51 to 100; 11) Over 101
How many manga books do you purchase in a month?	
How many manga fun publications do you purchase in a year?	

Table A2. Measures of innovation behaviors

Items	Anchors
Privatized Innovation	
Do you draw illustrations for yourself?	0) No; 1) Yes
Do you draw comics for yourself?	
Publicized Innovation	
Do you share illustrations that you drew on the Internet?	0) No; 1) Yes
Do you share comics that you drew on the Internet?	
Do you share illustrations that you drew in other traditional media such as papers, CDs, and DVDs?	
Do you share comics that you drew in other traditional media, such as paper, CDs, and DVDs.	
Profitable Innovation	
Do you sell illustrations that they drew to others?	0) No; 1) Yes
Do you sell comics that you drew to others?	
Do you sell illustrations that you drew and receive enough revenue to have a surplus?	
Do you sell comics that you drew and receive enough revenue to have a surplus?	

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