Why customers switch to digital contents while other not?

-Consumer characteristics affecting acceptance of new technology-

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Abstract

What is characteristics of individuals with "high acceptance of new technology"? When dramatic new technology and products appear, why some consumers switch to them while others not? In this paper, we investigated consumers' actual usage of innovative products and analyzed how economic, psychological, social factors, and internal characteristics of consumers influence on it. As one of representative innovative products that has spread in our daily life, we choose digital contents (music, video, game, and comic). As results of our quantitative analysis, we clarified that consumers' "tangibility preference" and "openness to experience" influence the usage of digital contents. As this background, our additional qualitative investigation revealed that people using music streaming service demand "convenience" and "much opportunities for new encounters", and people using mobile game want to get satisfaction with collecting and use more substantial contents. This explorative research casts lots of questions to be answered in the era of rapid and dramatic technological changes in our daily lives.

key word:

Acceptance of new technology,　Consumer behavior,　Psychological characteristic,　Digital contents

1. Introduction

What is the characteristic of individuals of "high acceptance of new technology"? We have witnessed a series of ongoing radical technical changes around us such as internet, and smartphone. When dramatic new technologies and products appear, why some consumers switch to them while others not? A lot of studies on diffusion of innovation have explained the subsequent phenomena. However, more essential questions remain -"what nature and characteristics of individuals influence whether accepting new technology or resisting?".

In this research, we investigated consumers' actual usage of new technology and analyzed how economic, psychological, social factors of consumers, and internal characteristics influence on it. As one of representative innovative products that has spread in our daily life, we choose digital contents (music, video, game, and comic). In this way, we suggest factors influencing consumers' acceptance of new technology, and try to deepen our understanding about diffusion of new products from the perspective of individual characteristics.

We humans have developed our civilization by creating new things, techniques and services, and continuously changed the environment surrounding ourselves. The change has proceeded rapidly for the past 40 years which is called "digital age", and it will be accelerated. Personal computers and smartphones are representative examples of digitalization. The household diffusion rate of smartphone rose from 9.7% in 2010 to 64.2% in 2014 in Japan

according to 2014 communication white paper reported by the Ministry of Internal Affairs and Communications information. While, on personal computer, it rose from 37.7% in 1999 to 75.7% in 2014. In this way, the big wave of technical change happens these days. In the era of rapid technological change, one of the fields most affected by digitization is contents industry. The consumers' purchasing form in contents industry is in the midst of drastic changes, and these days new monetize models, such as subscription model, has changed the business map of the industry. However, when we see the market size of the music streaming service in Japan, it is far behind compared to other developed countries. For example, sales in streaming service occupy 65% of the entire music industry sales in the United States (RIAA, 2017). On the other hand, it is said that the sales of the streaming service against the entire music industry in Japan is only 9% (RIAJ, 2017). By the way, purchasing form changed by the digitization of contents industry can be explained progressively. In this stream of change, people who positively adopt new things in early stage are so-called as "innovators" and "early adopters" (Rogers,1962). Consumers who are using digital contents in Japan can be regarded as "innovators" or "early adopters" because it is still in the process of diffusion of digital contents. What kind of characteris do they have?

We conducted researches focusing on consumers' actual usage of digital contents including music, video, game, and comic, which are the main component of contents industry. As targeted consumers, we selected university students because they are thought to have high

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interest and frequency of using digital contents. We find out consumers' actual usage of digital contents and investigate its association with personal characteristics so that clarify the characteristics of people who have high acceptance of new technology.

This paper consists of 6 chapters. In the next chapters, we reorganize previous researches from the viewpoint of diffusion of innovation and consumer behavior toward digital contents, and confirm its trend. And then, we state the overview of our methodology and analysis method in chapter 3. In chapter 4, we conduct binomial logistic regression analysis based on the results of our research, so that we clarify the relation between consumer characteristics and usage of digital contents. In the 5 chapter, we will try to focus on and qualitatively analyze the relation between acceptance of new technology and the degree of tangibility preference / openness to experience, based on the results from additional interview. In final chapter, we discuss about the all of results of our research, and suggest academic and practical implication for future research on diffusion of new technology and digital contents.

2. Literature Review

2.1 Literature Review on our research question

Our research question is "which consumer characteristics affect acceptance of new technology?"

Researches on diffusion of innovation and consumer behavior has been richly accumulated so far. However, these two streams of research has been developed respectively, without their merging discussions. Acceptance of new technology can be structured as a part of consumer characteristics. Therefore, considering about the basic factors which specify the consumer behavior is quite significant in order to understand about essence of consumer demands. That's why we are focusing on the relation between psychological characteristics of consumer and diffusion of innovation.

In the beginning, we will review researches on diffusion of innovation. In this field, one study is very famous that is known as "innovator theory" which is presented by *Everett M. Rogers*, who is a sociologist in Stanford University, in 1962 through his paper "virtually synonymous with the study of diffusion of innovations." Since we will discuss diffusion of innovation, we must review this study. This is well summarized in Akimoto (2005).

According to Akimoto (2005:39-54), Rogers named the consumer characteristic on acceptance of new technology as "consumer innovativeness" , and defined it as the degree to which innovation is adopted relatively earlier than other members of the social system which the individual belongs to (Rogers & Shoemaker, 1971, Uno translation, 1981:36). Moreover, he segmented consumers into "innovators", "early adopters", "early majority", "late majority", and "laggards" respectively based on the period from occurring of new products to purchase (Rogers, 1962). However, through following discussion, it is pointed that the idea of consumer

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innovativeness only explain "consumers who adopt new products at an early stage are innovators, and innovators adopt new products at an early stage", which finally fall into tautology (Midgley & Dowling, 1978: Venkatraman & Price, 1990). Therefore, it is necessary to discuss about innovativeness as a consumer characteristics from a deeper viewpoint on which characteristics consumers using innovative products have.

Secondly, as another study on diffusion of innovation, TAM (Technology Acceptance Model) is well known which is presented by *F. D. Davis*. TAM was developed on the back of a phenomenon that end-users of management information system in an organization would not use such new system. In his doctoral thesis, he applied "theory of reasoned action" (Fishbein & Ajzen, 1975: Ajzen & Fishbein, 1980) and introduced 2 factors into his study as what explain individual behavior of adopting new technology 一"perceived usefulness" on behalf of merits and "perceived ease of use"on behalf of costs in adopting new technology, and finally build TAM (Davis, 1985). After appearance of TAM, remake of the ideas have been conducted by *Davis* and his colleagues "which superordinate factor specifies subordinate factor directly/indirectly" (e.g. Davis, 1989). Through those remake, TAM2 which is introduced "behavioral intention" as third factor to specify acceptance of new technology (Malhotra & Galletta, 1999). Moreover, in order to build new integrated model which cover the relevant studies, they renamed "perceived usefulness" into "performance expectancy" and "perceived ease of use" into "effort expectancy", and added "facilitating conditions" as a factor which

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directly specify "use behavior" (Davis, et al., 2003). In this way, with Davis's study as the source, acceptance models of new technology have been developed by many researchers. In those models, although acceptance of new technology is considered from the viewpoint of "where consumers find the superiority of new products", and discussing the decision-making process, it has not been deeply discussed about what characteristics individuals have who wants to use new technology or who does not want to use new technology.

Next, since researches on consumer behavior are too extensive to simply summarize, we will conduct focused-review about consumer research on digital contents. As this subject is relatively new, discussions have started since 2000s. For this reason, although the direction of the discussions is common in terms of the fact that many researchers focus on "consumer characteristics", the detailed positioning of "consumers" varies widely according to research.

Firstly, *Ikuina et al.,* (2011: 58-68) elucidate the relation between consumer characteristics and consumption propensity (contact way) in music industry, focusing on consumers who lead the market, such as "market masters" and "consumers who also produce". In their discussion, it is described that consumption propensity (contact way) has been switched to digital contents as a whole trend, and some of consumption forms (e.g. concert) are not affected so much even though current tendency has been switched to digital. In addition, it is

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also said that consumers with characteristics of "market masters" or "consumers who also produce" will play a significant role to sustain and expand the market. Through this discussion, they clarified that the influence of digitization as a whole is significant. However, since "digital contents service" which is defined in their paper, such as internet site, DL purchase, and ringtone, exist from more than ten years ago, the scheme that "digital contents are equal to new technology" does not hold. Therefore, in this research, we must consider how to set up "digital contents".

Secondly, in Wagner & Hess (2013:1-8), they are concerned with "what drives users, who use freemium service in which they can use contents for free basically, to pay for premium contents". Then, they discuss what specify the consumers' intention of purchase toward premium contents based on the frame of Theory of Planned Behavior. Especially, they focus on "price value", "tangibility preference", and "innovativeness" as what specify consumer attitude. As a result of their research, it is revealed that the intention of using free service negatively affects the intention of using premium service, and "price value" gives the greatest influence on consumer attitude. Moreover, it is also revealed that "tangibility preference" negatively affects consumer attitude, and "innovativeness" positively affects attitude. However, this paper just elucidated what factors influence on consumer behavior toward freemium service, did not break it down into general viewpoint of diffusion of innovation and consumer behavior.

Thirdly, in Hata (2018:43-58), he is interested in switch of purchase channel and characteristics of purchased products, likewise from real shop to online shop, and from physical products to services. Then, he elucidated "what genre do consumers prefer", "what devices do consumers use", "how do consumers access to contents", and "what reading habit do consumers have" taking publications as an example of contents. However, his discussions are limited to the relation between the nature of goods and consumer behavioral characteristics related to "reading". Therefore, there is no discussion about consumer behavioral / psychological characteristics which is the most fundamental.

Thus, in the existing research on digital contents, what digital contents point to and what the consumer characteristics refer to depends on each of papers, and comprehensive discussion does not exist. In addition, there are only a few studies discussing digital contents and consumers from the perspectives of diffusion of innovation. "What is the characteristics of individuals which affect acceptance of new technology?" - In this research, we will discuss about "what psychological characteristic do consumers who have high acceptance of new technology have?" taking digital contents (music/video streaming, mobile game, comic app) as example of new technology.

2.2 Variable settings from literature review

In this section, we will organize the necessary frames to discuss the question "what kind of psychological characteristics will affect consumers' new technology acceptability?" from the viewpoint of consumer behavior theory. Next, we will develop some hypothesis based on prior researches.

The history of consumer behavior theory is well summarized by *Koyama* (1997: 85-192). In the field of consumer behavior theory, highly empirical systematic science began in the 1960s. Since then, the stimulus-response (SOR) model based on the new behavior theory and the information-oriented decision-making model has been launched. The main model of current consumer behavior theory originates from the Elaboration Likelihood Model (Petty & Cacioppo, 1986). This model argues that emotional and image processing is carried out and purchasing attitude is determined when the information is not refined even consumers recognized motivation. Conversely, when consumers strongly recognize the motivation and have abundant knowledge about the product (favorite things, expensive luxury goods etc.), the advanced information processing ability is demonstrated and the purchasing attitude is determined.

Based on ELM model, Koyama(1997:96) says "consumer behavior is an aspect of human behavior. Thus consumer behavior theory should be discussed not only by economic aspects

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but also by cross-cutting approaches from psychology and sociology.", and points out economic, psychological, social, cultural factors as factors defining purchasing attitudes. Accordingly, In this research, we consider economic, psychological, social, cultural factors as factors that define the decision-making process of accepting new technology.

(1) Economic factors

In this research, we asked disposable income as an economic index influencing purchase decision-making. Consumer disposable income seems to be a huge constraint on paying digital contents. The following hypotheses are developed in this study.

H1: Disposable income positively affects the usage of paid version of digital contents.

(2) Psychological factors

According to the Big five factor model by *Goldberg* (1990:, 1992), all psychological and behavioral characteristics of humans can be explained by a combination of five factors: Extraversion, Agreeableness, Conscientiousness, Neuroticism, Openness to Experience. Since the purpose of our research is to clarify the underlying factors that define consumer attitudes toward new technology, we adopted this Big five factor model as a measure of the psychological characteristics of consumers and decided to investigate exploratory rather than developing hypothesis for each factors. However, regarding to "openness to experience": the degree of interest and curiosity to new experience, imagination and originality, Midgley and

Dowling (1978: 238) mentioned the relation of personal innovation orientation and openness to ideas. Therefore, it seems that there is a certain relation between consumer characteristics who accept new technology and openness to experience, and it can be presumed that openness is affecting the use of digital contents.

H2: Openness to experience positively affects the usage of paid version of digital contents.

Furthermore, As a questionnaire, we adopted Ten Item Personality Inventory (TIPI-J) (Oshio et al., 2012) which measures Big five factor with 10 items.

(3) Social factors

Koyama (1997:158) makes detailed reference to social factors that affects consumers' purchase decision making. For example, the phenomenon that an individual takes the similar attitude and behavior as other people is called "conforming behavior" (Koyama, 1997: 158).

Even when paying to digital contents, individuals are considered to be greatly influenced by opinions and usage of surrounding people, because digital contents contain many elements that stimulate conforming consciousness. For example, some providers of music streaming services such as Spotify and Apple Music wage a campaign such as family discount. In mobile games, there are functions that allow players to share topics and enjoy multiplay. Therefore,

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H3: Usage situation of belonging groups positively affects the use of digital content.

(4) Cultural factors

Cultural factors also affect consumers' purchase decision-making process. In the prior study, subculture and social class are mentioned as examples of cultural factors. Subculture is represented by religion, and social class is represented by occupations (Ohsuga,1991: 34-36). However, in this research, it seems that there is no huge difference between the samples regarding religion and occupation because we adopt japanese university students as samples. Therefore, we decided not to develop items for measuring cultural factors.

So far, we have examined economic, psychological, social, cultural factors that determine the behavior of consumers who adopt new technology in detail. Next, consumer characteristics that should be specifically considered to explore the actual usage of "digital contents" is explained.

(5) Internal characteristics of consumers

In this research, we discuss the use of digital contents. Hence we selected items related to product involvement, tangibility preference, and computer and mobile anxiety as internal characteristics of consumers.

Product involvement

In consumer behavior theory, there are many concepts about involvement. Among them, we refer to "product involvement" advocated by *Bloch* (1982: 413) and asked how consumers engaged in each digital content. Product involvement is defined as an unobservable state reflecting the amount of interest, arousal or emotional attachment evoked by the product in a particular individual.(Bloch, 1982: 413) Based on this definition, it can be guessed that consumer do not mind expenses if the product involvement in specific content is high. Therefore, the following hypotheses are made in this research.

H4: Product involvement positively affects the usage of digital contents.

Tangibility preference

Contents such as CDs, DVDs, and books are becoming more intangible as digitization progresses. For example, Wagner & Hess (2013: 3) said "with the on-going digitalization of mediums (LP → CD → MP3 → MaaS), music is becoming increasingly intangible due to its loss of haptic attributes, which in turn influences consumers' behavior." They cite tangibility preference as a factor that determines the purchasing attitude to contents in freemium service. In addition, although it is revealed that the tangibility preference negatively affects consumer attitudes toward music digital contents, whether it can be applied to other digital contents or not is still unverified.

Therefore, in this study, we incorporated tangibility preference as internal characteristics of consumers, and made the following hypothesis.

H5: Tangibility preference has a negative influence on paid usage of digital contents.

Computer and mobile anxiety

Computer and mobile anxiety is a scale incorporated with reference to Ichikohji(2013：58). Computers and smartphones are closely related to digital contents because they are media to use digital contents. Anxiety to computers and smartphones is presumed to have a major influence in the purchase decision making process of digital contents and therefore we made it included in questionnaire items. In addition, since this research assumes usage of digital contents on mobile devices, we also mentioned the usage of mobile devices on the questionnaire.

H6: Computer and mobile anxiety negatively affects the usage of digital contents.

Based on the hypothesis above, in this research, we analyzes consumer behavior who adopt new technology from the viewpoint of economic, psychological, social, cultural factors and internal consumer characteristics (product involvement and computer & mobile anxiety) which is taken as an important index related to digital contents.
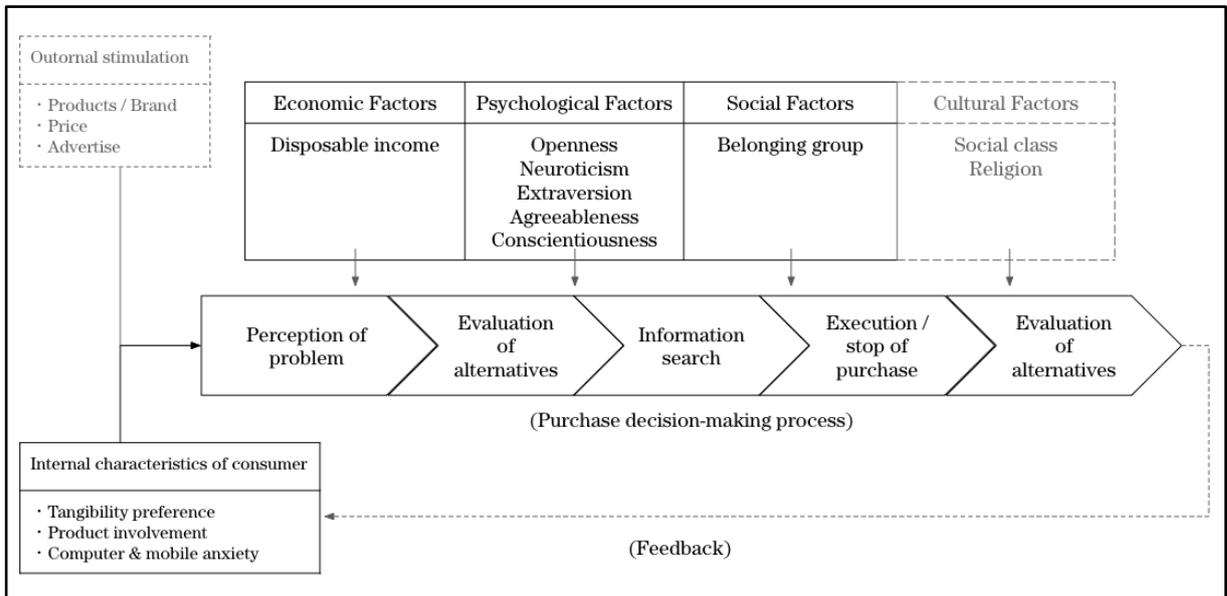
Figure1.   Analisis frame on consumers' purchase behavior

(Source: Authors, based on Koyama (1997:97))

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3. Methodology

In this chapter, the outline of our survey and research method is explained. Figure 2 shows

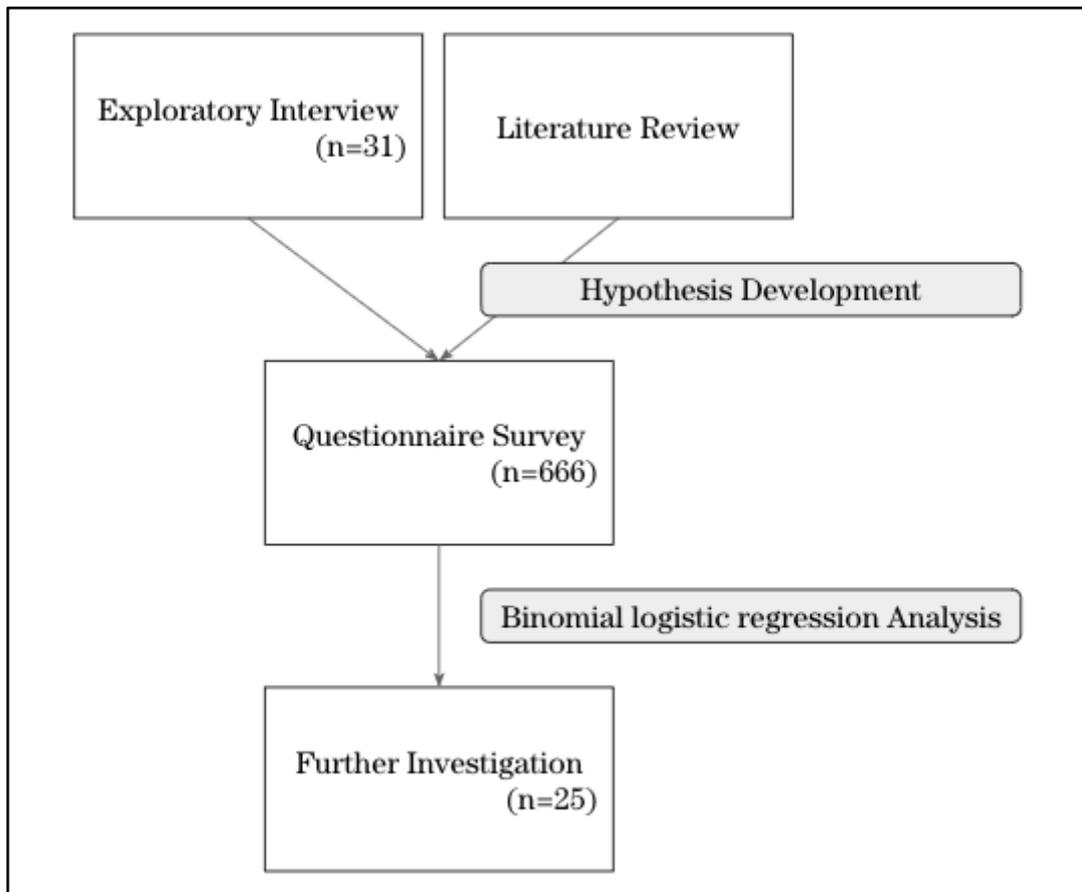our overall research flow, which is explained in the following.

Figure 2. Research flow

Source：Authors

3.1 Outline of the survey

(1) Implementation date of the survey and survey topic

Ministry of Economy, Trade and Industry(2018) defined "contents" as "contents of information composed of expression elements distributed on various media such as video, music, game, books, moving images, still images, sounds, characters, programs, etc.". Therefore, we collected data focusing on usage of 4 principal digital contents: music streaming service, video streaming service, mobile game, and comic app. In addition, we set questionnaire target for university students because products relating to music, video, game, and comic are tend to be consumed by young age and it is inferred that they reflect the state of consumption well. Also, it is expected that they will become market leaders in the future. It is significant to explore potential consumers' actual consumption.

As a first step, to understand the reality of contents consumption, we conducted explorative interviews of 31 consumers. As a result, we found that there are various business model, charging system, and consumers have a lot of options about consuming digital contents. Next step, questionnaire survey which is designed from exporative interviews and literature review is conducted for university students from 19th to 25th October using online questionnaire format. The answers were 439 cases (65.9%) for males, 224 cases (33.6%) for

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females, and 3 cases (0.5%) for others, totaling 666 cases, of which 661 cases were valid

responses.

(2) Questionnaire

First of all, in order to grasp the consumers' actual consumption, we asked questions about

whether to use the music streaming service, the video streaming service, the mobile game,

and the comic app.

Next, based on explorative interviews of 31 consumers and findings from findings from

previous researches, we developed items for measuring seven elements of consumer

characteristics: product involvement, tangibility preference, computer and mobile anxiety,

disposable income, tendency of digital contents use of group to which they belong. To increase

the response rate by minimizing the number of items, we adopted Ten Item Personality

Inventory (TIPI-J) (Oshio, Abe, Cutrone, 2012) to measure Big five factor.

In most items, the Likert scale of "1. absolutely not applicable" to "5. very well applicable"

was used. As for disposable income, we asked on a 5-step scale from "1. 0 to 19999 yen" to "5.

80000 yen ~". Details of questionnaire are listed in the Appendix.

3.2 Analysis

In order to verify what kind of consumers are spending money on digital contents, we clarify which consumer characteristics are affecting the use of digital contents by using regression analysis. We used the data of whether sample pay for digital contents: music streaming service, video streaming service, mobile game, comic app as independent variables. This data was replaced by a dummy variable of "0: not using" and "1: using", and binomial logistic regression analysis was conducted. For the item selection method, the forced entry method was adopted. Analysis revealed that variables on several psychological measures have an influence on the use of digital contents.

In this case, psychological factors of consumers are adopted as independent variables, and regression analysis can verify whether they affect use of digital contents. However, the background of the relation is still unclear. Therefore, we conducted additional hearing survey to investigate how the psychological characteristics of consumers lead them to practical actions of paying for digital contents and accepting new technology.

4. Results of the Survey

In this chapter, we will explain the results of the survey conducted according to the method described in Chapter 3 and verify the hypotheses developed in 2.2

4.1 Selection of independent variables and construction of regression model

In analysis, we set five independent variables, including product involvement, disposable income, computer and mobile anxiety, tangible preference, and openness. For independent variable items, a single regression analysis was conducted. As a result, we exclude other independent variables asked within questionnaires from consideration because they did not meet the 20% significance level. We constructed 4 regression models : conversion of dummy variables for use of music streaming service, video streaming service, pay contents of mobile games, pay contents of comic app to "1: using" and "0: not using" as dependent variables.
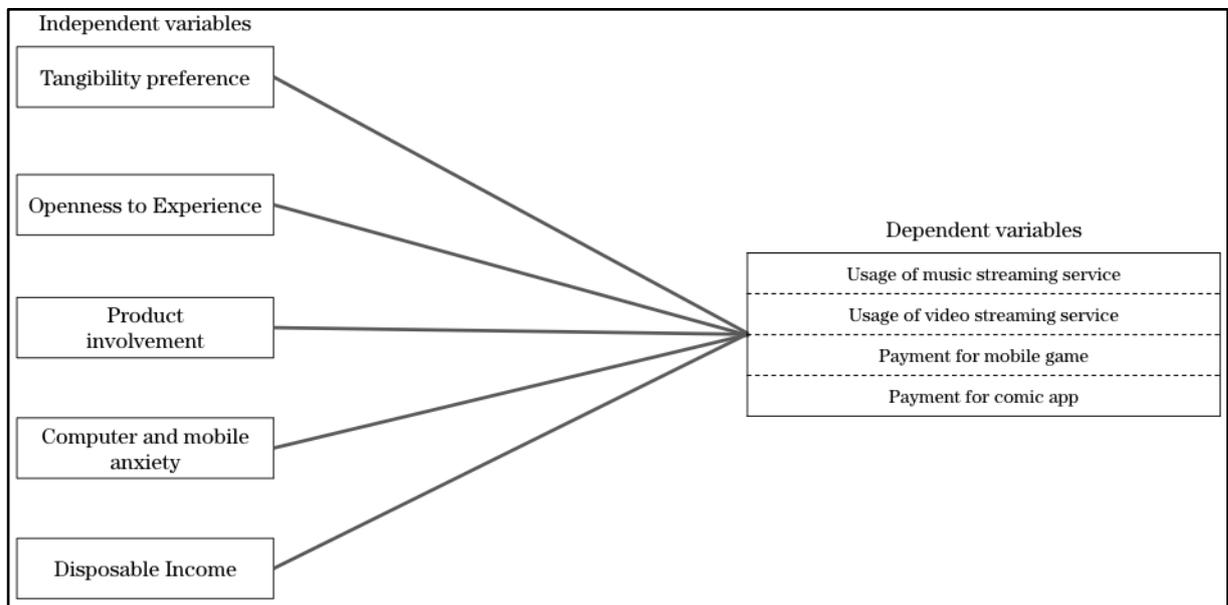

Figure3.　Regression model

4.2 Empirical Results

First, reliability analysis was verified by using Cronbach's α to confirm the validity of the composite variables composed of several items. Cronbach's α is an index of reliability analysis and acceptable only more than 0.7. In this case, all three items of tangibility preference, product involvement, computer and mobile anxiety were fulfilled the criterion. We also verified the multicollinearity by using the Variance Inflation Factor (VIF). VIF is an index of multiple collinearity and acceptable only no more than 10. In this case, all selected variables were fulfilled the criterion. Results of reliability analysis and multiple collinearity analysis are shown in Table 1.

Table1. Selected variables

Scale	Number of term	Cronbach's α *	VIF**
Tangibility preference	4	0.756	1.389
Openness to experience	2		1.02
Product involvement	12	0.855	1.392
Computer and mobile anxiety	2	0.843	1.059
Disposal income	1		1.019

Cronbach's α*=index of reliability analysis

VIF**=Variance Inflation Factor

Source : Authors

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4.3 Results of Binomial Logistic Regression Analysis

As a result of the survey, interestingly, it was revealed that "tangibility preference" and "openness to experience" are affecting many contents usage. Details of each regression models are as follows.

Music

Table 2 shows detail of the results. Openness to experience, product involvement and disposable income affected positively. On the other hand, tangibility preference, computer and mobile anxiety negatively affected.

Table2. Music streaming service

Explanatory variable	B	Standard error	Wald	Degree of freedom	Significance level	Exp(B)	The 95% confidence interval of Exp(B) min	Max
Tangibility preference	−0.104	0.029	13.253	1	*** 0.000	0.901	0.852	0.953
Openness to experience	0.101	0.049	4.225	1	** 0.04	1.107	1.005	1.219
Product involvement	0.033	0.012	8.332	1	***0.004	1.034	1.011	1.058
Computer and mobile anxiety	−0.132	0.043	9.228	1	*** 0.002	0.876	0.805	0.954
Disposable income	0.195	0.079	6.05	1	** 0.014	1.216	1.041	1.421

n=161 (p<0.01***,p<0.05**,p<0.1*,ns=p≧0.1)
Hosmer-Lemeshow(HL) test: p=0.851

Source: Author

Video

Table 3 shows details of the results. It was found that openness to experience, product involvement affected positively, computer and mobile anxiety negatively affected. On the other hand, there was no significant result on the tangibility preference.

Table 3. Video streaming service

Explanatory variable	B	Standard error	Wald	Degree of freedom	Significance level	Exp(B)	The 95% confidence interval of Exp(B) min	Max
Tangibility preference	−0.043	0.028	2.428	1	ns	0.958	0.907	1.011
Openness to experience	0.134	0.049	7.346	1	＊＊＊ 0.007	1.143	1.038	1.259
Product involvement	0.041	0.012	12.292	1	＊＊＊ 0.000	1.042	1.018	1.066
Computer and mobile anxiety	−0.215	0.045	23.227	1	＊＊＊ 0.000	0.806	0.739	0.88
Disposable income	0.164	0.079	4.253	1	＊＊ 0.039	1.178	1.008	1.376

n=172 (p<0.01***,p<0.05**,p<0.1*,ns=p≧0.1)

HL test: p=0.676

Source: Authors

Game

Table 4 shows details of the results. Tangibility preference and product involvement affected positively. Openness to experience, computer and mobile anxiety affected negatively. On the other hand, there was no significant result on disposable income.

Table 4. Mobile game

Explanatory variable	B	Standard error	Wald	Degree of freedom	Significance level	Exp(B)	The 95% confidence interval of Exp(B) min	Max
Tangibility preference	0.075	0.033	5.079	1	＊＊ 0.024	1.078	1.01	1.151
Openness to experience	−0.118	0.062	3.661	1	＊＊＊0.056	0.889	0.788	1.003
product involvement	0.063	0.015	18.67	1	＊＊＊0.000	1.065	1.035	1.096
Computer and mobile anxiety	−0.198	0.054	13.388	1	＊＊＊0.000	0.82	0.738	0.912
Disposable income	0.083	0.098	0.717	1	ns	1.087	0.896	1.318

n=105 (p<0.01***,p<0.05**,p<0.1*,ns=p≧0.1)

HL test: p=0.302

Source: Author

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Comic

Table 5 details the results. Tangibility preference was significant at 10% level, and disposable income affected positively. On the other hand, there were no significant relation with other independent variables.

Table 5. Comic app

Explanatory variable	B	Standard error	Wald	Degree of freedom	Significance level	The 95% confidence interval of Exp(B)		
						Exp(B)	min	Max
Tangibility preference	0.078	0.047	2.791	1	* 0.095	1.081	0.987	1.185
Openness to experience	−0.083	0.086	0.921	1	ns	0.921	0.778	1.09
Product involvement	0.02	0.02	1.064	1	ns	1.02	0.982	1.06
Computer and mobile anxiety	−0.061	0.072	0.711	1	ns	0.941	0.817	1.084
Disposable income	0.399	0.133	8.963	1	＊＊＊0.003	1.49	1.148	1.935

n=44 (p<0.01***,p<0.05**,p<0.1*,ns=p≧0.1)

HL test: p=0.731

Source: Author

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4.4 Interpretation of survey results

We analyze the results and verify the hypotheses established in 2.2. Table 6 shows summary of survey results.

Table6. Summary of survey results

Dependent variables	H1	H2	H4	H5	H6
Usage of music streaming service	verified	verified	verified	verified	verified
Usage of video streaming service	verified	verified	verified	unverified	verified
Payment for mobile game	unverified	**rejected**	verified	**rejected**	verified
Payment for comic app	verified	unverified	unverified	**rejected**	unverified

H1: Disposable income positively affects the usage of digital contents.
H2: Openness to experience positively affects the usage of digital contents.
H3: Usage situation of belonging groups positively affects the usage of digital contents.
H4: Product involvement positively affects the usage of digital contents.
H5: Tangibility preference negatively affects the usage of digital contents.
H6: : Computer and mobile anxiety negatively affects the usage of digital contents.

Source : Authors

In this research, some hypothesis of relations are not verified such as relation between usage of video streaming service and tangibility preference, using pay contents of mobile game and disposable income, payment for comic app and openness to experience / product involvement / computer and mobile anxiety. Interestingly, some results are contrary to hypothesis:payment for mobile game and openness to experience / tangibility preference, payment for comic app and tangibility preference. Other results agree with our hypothesis.

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5. Additional interview

In this chapter, we expain outline an additional survey and its results.

5.1 Background of Additional Survey Implementation

Hypothesis about product involvement, computer and mobile anxiety and disposable income were supported in the previous chapter, except relations that did not give significant results：influence of disposable income on the usage of mobile game and influence of involvement and computer and mobile anxiety on usage of comic app. On the other hand, we obtained opposite results to our hypothesis in terms of influence of consumers' tangibility preference and openness to experience on the usage of pay contents of mobile game.

It was revealed by regression analysis that openness to experience and tangibility preference are related to paying for usage of digital contents and opposite tendency can be observed regarding to usage of pay contents of mobile game. However, it is still unclear about the logics behind the results we obtained. Therefore, in order to clarify the background of the relation between each independent variable and the tangibility preference / openness to experience, we conducted a interviews to consumers.

5.2 Outline of Additional Survey

From the background described in the previous section, an additional interview survey was conducted. The survey targets were university students as same as the primary survey. We

got responses from 25 people. In the interview survey, we focused on usage of mobile game and music streaming service. It is because in the primary survey, results of mobile game were contrary to the hypothesis in terms of tangibility preference / openness to experience and use of music streaming service was also significantly affected by the two variables.

First of all, we asked if they are currently using / not using music streaming service and if they are paying / not paying for mobile game. Second, we asked the same variables using 14 items and 5 levels of Likert scale: tangibility preference and openness to experience. In addition, we asked the reason why survey targets are paying / not paying for music streaming service and mobile game. We asked additionally, the purpose of use, attractive and convenient point of them, etc. in an open question form.

5.3 Survey Results

First of all, in 25 respondents, 14 university students pay for music streaming service, 11 university students do not pay for them, 8 college students pay for mobile game, and 17 college students do not pay for them (Duplicate answers are given concerning the use of music streaming service and mobile game). Details of the targets and their answers are listed in the Appendix.

(1) The relation between openness to experience and digital contents

Among 14 music streaming service users, the majority of users whose openness to experience value exceed 7 tend to listen to songs of various artists / genres widely. Many of them mentioned variations of contents provided by the platform and its novelty as fascinating feature of music streaming service. On the other hand, most of users with 6 or less openness to experience had a opinions that listen to music of a few artists and genres carefully. As a result of the additional survey, it became clear that users of music streaming service are using the subscription service because they wished to listen to many new musics.

There were 8 people using pay contents of the mobile game. The openness to experience of 6 consumers in pay contents of the mobile game users was lower than the intermediate value of 7. When they are asked about the mobile game they use, many of them listed specific work titles or answered "I will focus on limited items or characters." On the other hand, it is revealed that users with relatively high openness to experience tend to utilize many types of applications widely. According to these answers, it became clear that the openness to experience of consumers determines the variation of games they play, and people with low openness to experience are absorbed in a small number of games and pay money to improve game's fulfillment.

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⑵ The relation between tangibility preference and digital contents

There were 13 users who answered "I do not apply at all." or "I do not apply." to the question "I prefer physically having CDs and so on to music files". We asked music streaming service users about fascination of and the reason they pay for it. Music streaming service users with lower tangibility preference tend to refer to the functional advantage of streaming service. For example, They had opinions such as "it takes time and effort to download music when using CDs", "it is easy to find music that suits my needs", "enjoy music easily". Meanwhile, survey targets with high tangibility preference tend to listen to music by purchasing CDs, renting them, etc. As mentioned above, higher tangibility preference people tend not to be interested in improving convenience through digitization. As a result of the additional questionnaire, it became clear that music streaming users with low tangibility preference respond strongly to improving convenience by supply form digitalization and they use music streaming service that can access the contents more easily than the conventional type.

On the other hand, people with high tangibility preference using pay contents of mobile game mentioned "acquiring items / characters" and "training of characters" as a purpose of charging. People who like tangibility preference, that is, people who prefer shapes are considered to have one aspect that desire to collect objects. Therefore, elements such as "acquisition of items / characters" and "training of characters" in mobile game stimulate the

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collection desire of people with high tangibility preference, and are presumed to affect the purchase decision.

6. Discussions

In this paper, to investigate consumer characteristics that affect new technology acceptance, we focused on a contents industry, which is one of the fields most influenced by digitalization. Through three-steps of qualitative and quantitative analysis, we tried to figure out what kind of consumer characteristics affect the acceptance of new technology, and why.

As a result, as described in chapter 4 and 5, we clarifire that tangibility preference negatively affects the usage of music streaming service, and openness to experience has positive influence on the usage of it. As a background of this, people with high openness to experience required "opportunities for a new encounter" in the digital platform of music contents. Moreover, people with low tangibility preference take "convenience" as the value of digital contents. Interestingly, about the usage of mobile game, the consumer trend showed the very opposite result against those of music streaming service. In other words, consumes' tangibility preference influences positively and openness to experience has negative influence. As a background of this, those who have strong tangibility preference are trying to satisfy

"collection desire" which is regarded as one aspect of tangibility preference such as "item collection and character development" through charging. In addition, about people with low openness to experience, it is revealed that they focus on specific content, which extend to charging behavior in order to raise its fulfillment level. In addition, we would like to mention the implications obtained from the consideration of the relation between consumers' openness to experience and the usage of digital contents. From the additional survey, we confirmed that the consumers' openness to experience has positive influence on usage of digital music contents against the background of "opportunities for a new encounter". On the contrary, we clarified that users with low openness to experience use few contents and paying it to raise the degree of fulfillment of contents, regarding to mobile game.

We point out largely three academic implications of this research here.

First, we claim the significance of our research as an attempt to bridge the gap between both disciplines such as discussions on diffusion of innovation and consumer behavior theory. Not only previous studies (Ono, 2008: Ichikohji, 2013) that focused on the contents industry, but also studies on diffusion of innovation introduced in literature review (Rogers, 1962: Akimoto, 2005) interpret consumers' acceptance of new technology from the viewpoint of behavioral characteristics or new technology itself. However, in this research, we consider consumers who have high acceptance of new technology from the viewpoint of psychological

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characteristics which precede behavioral characteristics. Prior researches that observe

individuals from the outside, and then interpreter the diffusion of innovation from their

social behavior and role give a great deal of suggestions. Nevertheless, exploring individual

behavior and the underlying psychology more deeply is another significant point to

understanding the diffusion of new technology and new products. Although this research is

an exploratory approach in a limited industry area, we believe that it is a novel attempt to

combine both fields of innovation and consumer behavior and psychology. Secondly, we

aimed for more practical business administration research focusing on the variation of

innovation. Prior researches on innovation and contents industry have conducted empirical

researches focusing on specific products, but did not draw much attention to differences in

product characteristics within the same industry. Therefore, we analyzed that the behavioral

and psychological characteristics which affect on consumers' choice whether they use them or

not, focusing on the characteristics of the 4 contents in the research subjects. As a result, we

clarified that openness to experience has a contrasting influence on purchase decision

making depending on the variation of new technology, such as "music streaming service" and

"mobile game". From these findings, we can suggest that it is required to examine as to what

kind of characteristics of new technology attracts users with high or low openness to

experience. The third implication is that we should take into account of the significance of

tangibility preference as a new factor which specify acceptance of new technology. In prior

researches on acceptance of new technology, as mentioned in the part of literature review, there are only few research examining underlying consumer characteristics. Through our research, it is elucidated that tangibility preference negatively affect on the usage of digital contents backed by consumer demands of "convenience". Convenience, which can be regarded as "ease of access" is one of the factors to reduce psychological barrier of consumers toward new experience. New-coming technology will be closely related with digital. Hence it is inferred that consumers with low tangibility preference, who demand "ease of access", have less psychological barrier toward them, in other words, have high acceptance. Thus, we suggest that we should take account of the significance of tangibility preference as a new factor which specify acceptance of new technology in the future.

In addition to the three academic implications above, as a practical implication, we considered one point for contents business from the findings of our analysis results.

It is about a strategy to take in potential customers, considering their psychological characteristics. For example, in the usage of digital music contents, if added value with persistence on favorite artists is provided, a provider would create a chance to attract consumers who do not currently use streaming service. As mentioned above, tangibility preference has negative influence on the usage of digital music contents. Thus, through the additional survey to reveal its backgrounds, consumers with high tangibility preference told us that they use CD instead of digital contents because they want to keep it as their property. In

addition, openness to experience has positive influence on the usage of digital music contents.

On this result, through the additional survey to reveal its backgrounds, consumers with low openness to experience told us that they do not use digital contents because they listen to limited favorite music. From these answers, it is unveiled that consumers who do not use digital music contents regard the perpetuity of properties as important, and listen to limited favorite musics. In other words, it is inferred that they put their favors into a few of specific artist or genre and its degree is relatively high. Because of this reason, they have a demand to keep contents permanently in their hands. Then, as an example, if added value, likewise "users can get a right to download a wallpaper when they have listened songs of same artist in specific times" is offered, potential consumers would be attracted and get into the market, who put their favors into a few of specific artist or regard the perpetuity of properties as important, we believe.

Although there are academic and practical implications as described above, there are some future works to be done to validate and generalize the findings of this research.

Firstly, we were able to handle only a part of psychological characteristics of consumers in this paper due to the limitation of resources including time. Many factors other than what discussed in this paper can be considered as consumers' psychological and behavioral factors affecting acceptance of new products and technology. In the future research, we should examine factors more widely. Secondary, data collection targeting more varied consumers is

needed in order to study acceptance of new technology of more general consumers. We conducted questionnaire survey for 666 university students in this paper and investigated consumer psychological characteristics of twenties in which the usage of digital contents is the most active. Even though the results have some validity, we should expand the coverage of our research targeting varied samples which is segmented by generation, occupation, region etc. so that we can examine the relation between acceptance of new technology and psychological characteristics of consumers universally. It will give us further discover and consideration. Thirdly, this is a future task of research on music contents which we especially focused in our research, we should discuss about "another type of digital music contents" compared to streaming and tangible music contents. In this paper, we take streaming as the representative of digital music contents. However, it is still not cleared whether the result and consideration of our research is common for whole digital music contents services because there are "other types" such as download and freemium, which is not considered in this paper. Therefore, we have to compare tangible contents with "another type of digital contents" and streaming with "another type" so that we discuss on our subject from other perspectives.

In the IT society brought by smartphones and internet, we witness the emergence of new technology day after day. What we often use might be rapidly transformed and replaced by

new technology such as AI, automatic driving and cashless. In such era, why some

consumers actively accept new technology, and others avoid it sticking to conventional ones?

Although the findings of this research shed light only on a part of behavioral and

psychological characteristics of consumers, it casts lots of questions to be answered in our

era of dramatic technological changes.

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8. Appendix

Table7. Questionnaires for the survey

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		Questionnaires
Dependent variable	Usage of digital contents (individual)	1. 現在定額音楽配信サービス（Spotify, Apple Music, LINE MUSICなど）を利用していますか。
		2. 現在動画配信サービス（Netflix, Huluなど）を利用していますか。
		3. モバイルゲーム（パズル＆ドラゴンズ、モンスターストライクなど）の有料コンテンツを利用していますか。
		4. 漫画アプリ（LINEマンガ、ピッコマ、comicoなど）の有料コンテンツを利用していますか
Independent variables	Big five	1. 活発で，外向的だと思う
		2. 他人に不満をもち，もめごとを起こしやすいと思う
		3. しっかりしていて，自分に厳しいと思う
		4. 心配性で，うろたえやすいと思う
		5. 新しいことが好きで，変わった考えをもつと思う
		6. ひかえめで，おとなしいと思う
		7. 人に気をつかう，やさしい人間だと思う
		8. だらしなく，うっかりしていると思う
		9. 冷静で，気分が安定していると思う
		10. 発想力に欠けた，平凡な人間だと思う
	Product involvement	11. 音楽に関心がある
		12. 動画に関心がある
		13. ゲームに関心がある
		14. 漫画に関心がある
		15. 音楽について積極的に情報収集したい。
		16. 動画について積極的に情報収集したい。
		17. ゲームについて積極的に情報収集したい。
		18. 漫画について積極的に情報収集したい。
		19. お金があれば音楽聴取メディアを積極的に購入したい。（定額サービスへの加入など）
		20. お金があれば動画視聴メディアを積極的に購入したい。（定額配信サービスへの加入など）
		21. お金があればゲームを積極的に購入したい。（課金コンテンツ含む）
		22. お金があれば漫画を積極的に購入したい。（アプリ課金なども含む）

Independent variables	Tangibility preference	23. 楽曲ファイルよりCDなどを物理的に持つことを好む
		24. 動画ファイルよりDVD, Blu-rayなどを物理的に持つことを好む
		25. ゲームはダウンロード版よりディスク版を物理的に持つことを好む
		26. 電子版の漫画より単行本を物理的に持つことを好む
	Computer and mobile anxiety	27. 私はコンピュータやスマートフォンを使うことに苦手意識がある。
		28. 私はコンピュータやスマートフォンを使うことに慣れていない。
	Disposable income	29. 1ヶ月あたりの可処分所得（自由に使用できる所得の総額）を教えてください。
	Usage of digital contents (belonging group)	30. 私の周囲の人々（家族，親しい友人）は定額音楽配信サービスを利用している者が多い
		31. 私の周囲の人々（家族，親しい友人）は定額動画配信サービスを利用している者が多い。
		32. 私の周囲の人々（家族，親しい友人）はモバイルゲームに課金している者が多い。
		33. 私の周囲の人々（家族，親しい友人）は漫画アプリに課金している者が多い。

Source：Authors

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Table 8. Additional Survey Target List

Sample number	Usage of Music Streaming Service	Payment to mobile game	Tangibility preference (Music)	Tangibility preference (Game)	Openness to experience
1	Y	N	1	1	8
2	Y	N	3	3	9
3	Y	N	1	5	6
4	N	N	2	2	8
5	Y	N	3	2	9
6	N	N	2	3	3
7	Y	Y	1	1	6
8	Y	N	3	5	4
9	Y	N	3	1	8
10	Y	N	3	4	7
11	N	N	3	2	3
12	Y	N	2	2	7
13	Y	Y	1	1	9
14	Y	N	2	2	5
15	N	N	4	4	6
16	Y	N	3	4	8
17	Y	N	1	1	8
18	N	Y	4	3	4
19	N	Y	1	1	3
20	N	Y	5	3	6
21	N	N	2	2	4
22	Y	Y	2	2	8
23	N	Y	4	3	4
24	N	Y	1	1	7
25	N	N	4	4	4

* Y = Yes, N = No

** Openness to experience = I like new things and I think I have unusual ideas

+ (6 - I think that I am an ordinary human who is lacking in idea)

Source : Authors

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