Original Paper

iPhone and Android: a Comparison of User Satisfaction

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Abstract: The research question of this study was: “Do different ecosystem management strategies on the part of platform leaders affect the performance of products and services on the platform?” To test this, we researched product satisfaction with the iPhone and Android smartphones, using 666 people as a target population. On validating the difference in means of tests for each variable about product satisfaction, almost all variables demonstrated that the satisfaction of iPhone users was higher than that of Android users. The contributions of our research are as follows. First, we propose a theoretical perspective that could resolve the problem of the two opposing strategic purposes. Our perspective involves the industry’s life cycle and classifying patterns of product satisfaction. We tested product satisfaction in each platform on the basis of our perspective. Second, our research provides variables about smartphone user satisfaction from a correspondence analysis based on 666 smartphone users.

Keywords: Platform Management, Ecosystem, Product Satisfaction, iPhone, Android

1. Introduction

At present, it is difficult for a single manufacture to develop new products and for these products to show a competitive advantage in the mobile phone or digital home electronics industry. If a manufacturer hopes to develop high-performance and customer-oriented products, various companies typically provide some of the requisite technologies or components and these technologies or components are then successfully integrated. In this regard, studies in technology management or strategic management often discuss the concept of a “platform” or “ecosystem” [1][2].

These studies have the theoretical task of explaining how platform leader management can lead to a progressive ecosystem [2]. We can define ecosystem as a corporative network that consist of investors, suppliers and customers, and this concept is metaphor as an ecological system in nature [2].

If a platform leader wants to develop an ecosystem, that leader should tackle a problem as a platform leader and have third-party developers join the platform and focus on developing attractive products or services [1][2].

From this, a platform leader has two strategic purposes: first, the platform leader integrally controls products or services that are provided on the platform, and second, the platform leader allows third-party companies to develop products to give full play to the capabilities of the ecosystem, creating variety and attractive products or services on the platform. These opposing purposes are one of the most important issues in ecosystem management by a platform leader [3].

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Although the study of such ecosystem or platform management has a certain research body of theoretical works [1], there are only a few examples of empirical research [4]. In this study, we examined how differences in strategy among platform leaders managing ecosystems affect product performance, using the mobile smartphone industry as an example. Specifically, this work compares iPhone platform products, based on iOS, and Android platform products, based on Android OS.

First, consider the current smartphone market. The expected total shipment volume of smartphones worldwide was 794 million units in 2013, and one market research company expects that shipments will exceed one billion units in 2015 [5]. The Japanese smartphone market has similarly grown rapidly. The Japanese domestic smartphone diffusion rate was 49.5% in 2012 [6]. In particular, the Android OS and iOS had a majority mobile OS share, worldwide and in Japan, in 2012 [6].

The smartphone industry can be considered a layered structure: hardware, network, applications, and content. In terms of these layers, Apple and Google are platform leaders having differing strategies. Apple and iPhone integrate, from a mobile device to content, vertically. On the other hand, the Android platform has an open structure whereby various manufacturers provide smartphones, except that the Android OS is provided by Google for all of them, and the market’s regulation is looser than Apple’s.

In terms of platform management strategy, it seems that Apple regards integration of the mobile device, applications, and content as important, whereas Google attaches importance to the variety of these features. Here, we examine how differences in management affect the performance of the ecosystem. To examine that, we compared the satisfaction of iPhone and Android smartphone users.

Theories regarding marketing and customer behavior have accumulated from past studies about digital electronics user satisfaction and utilization since the 1990s [7] [8] [9]. It is easy to add new functionality to digital home electronics, including mobile phones, because text, sound, picture, and video are controlled as digital data, recorded as “1”s and “0”s, using common electronics components. However, until recently, electronics users have not been able to use these various devices together [8].

Marketing theory describes the multifunctional features of digital devices as “convergent products” (CPs) or “digital convergence” [8] [9]. The point at issue in compatibility is the trade-off between digital device functionality and usability [8]. In this work, we focused on the end user utility of smartphones.

In the next section, we review past studies on platforms and product satisfaction with digital devices and reveal the development sequence in these past studies and their theoretical limits. In the third section, we derive hypotheses, and examine statistically the different degrees of product satisfaction between iPhone and Android devices. In the fourth section, we provide a discussion and conclusions based on our theoretical review and statistical examination.

2. A Review of Previous Studies

2-1. Platform Studies

A platform refers to a technological infrastructure that allows new innovation through interactions between multiple companies or users [1] [10]. In the smartphone industry, the mobile OSs – iOS and Android OS – and the mobile application markets – the App Store and Google Market – seem to correspond to platforms, and mobile device manufacturers or application suppliers provide products or services on these platforms. Platform studies refer to a platform leader as an entity that manages its own platform [1]. An ecosystem means a cooperative network, consisting of a platform leader, third-party companies that provide devices or content services, contributors, and end users, and is a metaphor stemming from a situation in the natural world [2].

The ultimate goal for a platform leader is the prosperity of the whole ecosystem, with a focus on its own platform. Iansiti and Levien use the word keystone for a leader that prospers in their ecosystem over the long-term, and they distinguish between a keystone and a dominant firm, which merely exploits affiliated companies [2].

Platform leaders should pursue two conflicting strategies to achieve this ultimate goal. The first is to control products or services that are created by third-party developers on the platform. The second strategy is to trust controlling products or applications to third-party companies to facilitate service variety [11]. We term the former “management for integrity” and the latter “management for variety,” and we inference “management for integrity” is more efficient strategy in a growth-stage industry. This is one of the points in our review and hypothesis.

The question of how a platform leader strikes a balance between these two conflicting aspects is currently a subject of research [3] [11]. On this issue, in this study, we perceive that it depends on the degree of development of an industry or the ultimate goal of the platform leader as to which strategy is emphasized. In particular, in this study, we focus on platform management at an early stage of the industry lifecycle [12], and we present hypotheses to examine that below.

2-2. Product Satisfaction Studies

Product satisfaction research about digital device use has accumulated since the 1990s [7] [8] [9]. In terms of product satisfaction, this study should discuss two points. First, when a product is digitalized, how functional are the features? Second, if we want to classify end user satisfaction with digital devices, which factors are to be distinguished?

Regarding the functional features of digital products, concepts of convergent products (CPs) or digital convergence pertain. These words indicate that a digital product has features that simplify putting several functions together. Because all digital data ultimately consists of the same digital signal, a stream of 1s and 0s, then, at least in theory, any digital content – audio, video, text, and images – can be stored, processed, and displayed using the same digital device(s) [13]. As with other digital devices, a typical mobile phone today can include several functions: camera, mp3 player, and video player, for example. However, even if a digital device *may* have many functions, it will not achieve product satisfaction unless the end user considers that the newly added functions are useful [9]. Indeed, depending on the situation, overly added functions can even impoverish the end user experience [8].

Regarding utility to the digital device user, Thompson et al. showed a conceptual axis: functionality (or capability) and usability [8]. Functionality refers to a function group that a user hopes to have installed on a device. Generally, even if a user evaluates a new added function as beneficial [7], the number of added functions does not always result in proportionally increased user satisfaction or utility. Usability refers to product operability or comfort when using a device and constitutes the user’s subjective satisfaction [8]. Our research follows Thompson et al.’s conceptual axis: functionality and usability [8] because the axis seems to be universal in a utility to the digital device user. This is one of the points in this review and our hypothesis.

In terms of smartphones to be examined in this study, we considered that Japanese manufacturers would face problems

with over-added functions. Our reasoning was that Japanese manufacturers have developed feature phones that are equipped with many functions. Some fraction of existing Japanese users would like to encourage manufacturers to add further functions (e.g., infrared data communication, mobile wallet, and One-Seg television). However, such additions could negatively affect product satisfaction for many users.

3. Hypothesis and Testing

3.1 Hypothesis

The smartphone industry has a number of technologically layered structures: devices, networks, applications, and content layers [13] [14]. The device layer consists of the mobile hardware and OS, the network refers to mobile telephone signals and communication protocols (e.g., TCP/IP), and an application is a tool for using content: text, audio, pictures, and video [14]. There are supplier companies in each layer in the smartphone industry. The platform leaders affect the actions of third-party developers through managing the mobile OS and application markets, the App store and Google market.

In the section above, we described the two conflicting strategies in platform management [3] [11]. These are the policy of strictly controlling third-party companies and the policy of leaving part of the control to supplier companies. We term the former “management for integrity” and the latter “management for variety”. When we compare Apple and Google in this respect, Apple seems to regard management for integrity as important whereas Google seems to attach importance to management for variety.

In 2014, the smartphone industry in developed countries seems to be approaching a growth period in terms of product diffusion. Generally, customers become aware of new products and entry companies are beginning to increase [12]. Practically, many companies are entering the market in each of the four smartphone industry layers [5].

However, currently, manufacturers cannot fully identify what smartphone users want in terms of functions or benefits. Similarly, entry companies in the smartphone industry do not comprehend what kind of influence the services can have when developers create devices or applications. In this situation, integrated platform management should be more effective than management for variety, because such integrated management will establish consistency in the four smartphone industry layers, and this integrity in services would seem to increase comprehensive end user satisfaction.

Platform management can also affect several aspects of device satisfaction; specifically, utility and functionality [8]. When a platform leader closely coordinates all technological factors – mobile device performance and application software – then usability will be achieved and user satisfaction will be increased. However, we suggest that if several supplier companies provide various products or services, functionality is likely to increase. These considerations lead to the following hypotheses.

Hypothesis 1:

If a platform leader and manufacturer attach importance to product integrity over variety, then the product leads to comprehensive user satisfaction in an introductory or growth-stage industry.

Hypothesis 2:

In terms of usability, if a platform leader and manufacturer attach importance to product integrity over variety, the product will lead to higher end user satisfaction.

Hypothesis 3:

In terms of functionality, if a platform leader and manufacturers attach importance to product variety over integrity, the products will lead to higher end user satisfaction.

3.2 Methods

In this study, we used a questionnaire targeting iPhone and Android users – 333 of each for a total of 666 people – through the Internet. The people targeted were male and female users, over 10 years old, who had purchased a device in or after April 2010, from across the whole country. The survey items were product satisfaction and comprehensive product satisfaction questions such as: “Q. What issues are you satisfied with when using your smartphone?” and “Q. How satisfied are you in using your smartphone?” There were 15 questionnaire items about satisfaction, with multiple answers. It was a nominal scale. If a respondent answered “Yes” to an item, then the score was 1. If a respondent answers “No” to an item, then the score was 0. The question about comprehensive satisfaction used a five-point scale.

We examined whether there was a significant difference between iPhone users’ and Android users’ satisfaction. First, we analyzed the 15 satisfaction points through a correspondence analysis to derive the variables of user satisfaction. This resulted in six variables from the 15 items. Regarding satisfaction points, we regarded the total number for each question answered “Yes” as the scale score of the variable. We then examined differences in the means for each variable. For comprehensive satisfaction, we used a five-point scale from the questionnaire. Table 1 shows the details of the questionnaire items. We used the 'R' software (ver. 3.0.2) [15] for the correspondence analysis and the SPSS software (ver. 20) for the difference of means tests.

Question items	Detail
display1	The display is fine
display2	The display is huge
Camera	The camera is high-performance
Mail	The email is high-performance
Operating	It is easy to operate
Web	Viewing a PC website is possible
PC_data	Data management is possible with a PC
app_n	The number of applications is high
app_q	Applications are of good quality
WLAN	Wireless LAN is usable
Bluetooth	Bluetooth is usable
Response	Response is quick
terminal_w	The terminal is light
terminal_t	The terminal is thin
Battery	The durability of the battery is sufficient
Satisfaction	General satisfaction (five-point scale)

Table 1. The question items of satisfaction points and general satisfaction.

3.3 Results

3.3.1 Correspondence analysis

Figure 1 shows the result of the correspondence analysis. Because there were 15 questionnaire items, we can derive a conceptual axis from the first to the fourteenth axis through the analysis. We extracted the first and second axes from these, and plotted each questionnaire item. The contribution ratio of the first axis was 13.1% and of the second it was 11.7%. We encircled the coordinate points that were close to the origin of coordinates. We regarded items that belonged to the same circles as identical variables.

Table 2 shows the correspondence between variables and questionnaire items. We can codify the variables as "image_display," "mail_web," "usability," "appli_mobile," and "terminal_size" from the correspondence analysis. We examine differences in means tests as a target for these variables and the item or variables of comprehensive satisfaction in the next section.

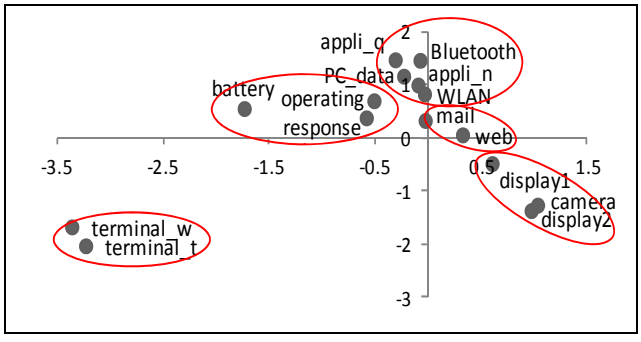

Figure 1. Correspondence analysis.

Variables	Question items
appli_mobile	PC_data, appli_n, appli_q, WLAN, Bluetooth
mail_web	mail, web
usability	operating, response, battery
terminal_size	terminal_w, terminal_t
image_display	display1, display2, camera

Table 2.Variables and question items.

3.3.2 Difference of means test

Table 3 shows the mean values of the variables. It can be seen that all variables were higher for the iPhone than the Android except "terminal_size". Furthermore, Table 4 indicates the results of the difference in means tests examining the variables mentioned above. First, we checked with Levene's test for homogeneity of the variance. That test rejected the homogeneity of variance at a significance level of 1%, therefore we examine a difference of means test by Welch's t-test.

	iPhone	Android	greatest value
satisfaction	4.10	3.62	5
appli_mobile	1.71	0.80	5
mail_web	0.46	0.22	2
usability	0.74	0.38	3
terminal_size	0.19	0.32	2
image_display	1.45	0.87	3

Table3. The result of the mean value of variables

	Levene's test		Welch's t-test			
	F value	p value	t value	degree of freedom	p value	mean of the differences
satisfaction	15.763	.000	6.873	653.294	.000	.483
appli_mobile	64.239	.000	9.146	588.483	.000	.919
mail_web	111.122	.000	5.566	576.473	.000	.243
usability	36.871	.000	6.156	617.893	.000	.366
terminal_size	31.747	.000	-2.823	620.600	.005	-.129
image_display	20.985	.000	8.372	648.104	.000	.580

Table 4. The result of Welch's t-test

The means of the differences are shown in Table 3, indicating the differences in each variable between iPhone and Android devices. A positive number indicates the relative degree of an iPhone user's satisfaction. Because the value of "satisfaction" was positive and met the 1% significance level, the result shows that the comprehensive satisfaction of iPhone users was higher than that of Android users. Thus, hypothesis 1 was supported.

Because the value of "usability" was positive and met the 1% significance level, these results show that iPhone users' satisfaction, as related to operability, was higher than Android users' satisfaction. Thus, hypothesis 2 was supported.

Functionality seemed to consist of the following variables: “image_display”, “mail_web”, “appli_mobile”, and “terminal_size”. These variables met the 1% significance level. However, “terminal_size” was the only negative value. This indicated that Android users’ satisfaction with “terminal_size” was higher than that of iPhone users. The iPhone scored higher for the other variables: ”image_display”, “mail_web”, and “appli_mobile”. Thus, hypothesis 3 was not fully supported. Further, we can observe highly rated “terminal_size” in Japanese company’s products especially Sharp.

4. Discussion

In this section, we discuss why user satisfaction with the iPhone was superior to that with Android devices, based on the results of our analysis. In particular, we focus the discussion on adding features to smartphones, and what the difference was in the ultimate business objectives for each of the platform leaders. Regarding the dominant mobile device, we suggest that Japanese mobile phone users want smartphones equipped with many functions [16]. Kinjyo et al. examined mobile phone users’ behavior, targeting 1000 feature phone and smartphone users [17]. According to Kinjyo et al., Android smartphone users hoped to continually increase the features, adding infrared data communication, mobile wallet, One-Seg television and compact size phone [17].

Japanese mobile phone manufacturers that use the Android OS comprehensively added these functions to smartphones. For example, the IS03 launched by Sharp in November 2010 was typical. Although these functions can be added to a smartphone that already has multiple functions, it seems to have been difficult for manufacturers to integrate or coordinate all of the new and existing functions within a short period of development. On the other hand, the iPhone has none of these functions and has sufficient functions as a smartphone. Thus, we suggest that Apple aimed at perfection in terms of coordinating the technological components of its smartphone. Because of factors like this path dependence [16], the degree of satisfaction is different between iPhone and Android smartphone users.

The next issue concerns the different business objectives of the platform leaders. Although Apple and Google are the platform leaders that control and provide the mobile OS, they both have different ultimate business objectives [18]. It is Apple’s aim to gain a business profit through enclosing mobile users; providing the user with vertically integrated mobile devices, applications, and content. On the other hand, Google is concerned with maximization of advertising revenues, from web services primarily. Thus, Google seeks mostly to achieve this aim through providing manufacturers with the mobile OS, because it increases the number of mobile users who can access the Internet. Thus, we might suggest that Google has little motivation to coordinate products or services on the Android OS platform [18]. This difference in the business objectives of the platform leaders seems to have informed the difference in product satisfaction between users of the two devices.

5. Conclusions

Our research aim was to examine how differences in ecosystem management strategy of platform leaders affected mobile products or services on these platforms. A platform leader can have two conflicting strategic objectives: first, controlling the products or services of the platform leader, and, second, increasing the variety of products or services available on a platform. Regarding this issue, we examined differences in end user product satisfaction.

This study revealed the following: First, when a platform leader is focused on the coherence of a mobile device, applications, and content, the mobile user may experience higher comprehensive product satisfaction in a growth-stage industry. Second, a mobile user can enjoy higher satisfaction of utility in a platform where a platform leader emphasizes product integrity. Third, when a platform leader attaches importance to product or service variety, user satisfaction in functionality increases in a partial manner.

Our theoretical contribution is as follows. First, this study focused on the conflicting strategic purposes of platform leaders and examined user satisfaction with product performance based on these strategic purposes. Second, because the smartphone market is a relatively recent phenomenon, product satisfaction studies have not revealed the variables of satisfaction regarding smartphones. In this study, we derived satisfaction variables through research into 666 smartphone users, by means of a correspondence analysis.

The implications of this study are mainly for Japanese manufacturers. Today, some existing mobile users want functions added to their phone [17] and Japanese manufacturers have responded to this. However, it is possible to add too many functions, which can negatively affect comprehensive product satisfaction. Indeed, Japanese companies should focus on usability in particular.

This study has some limitations. First, although we tried to examine the effects of the two conflicting platform management strategies, this work only applies to an industry in a growth stage. We should continue to examine the two strategies’ effects as the smartphone industry reaches a more mature stage. Second, in terms of setting variables of product satisfaction, our analysis has some problems. In particular, because the conceptual axis derived by correspondence analysis had a low cumulative contribution rate, this work might not measure user product satisfaction comprehensively. In a future study, we should repeat the data collection and analysis through a rigid questionnaire design. However, in terms of general satisfaction, we seem to be able to consider iPhone is superior.

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