Tablet Computers Replacement Trend for Computers

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ABSTRACT. *Over the last few decades, significant progress has been witnessed with how tasks are carried out. Generally, consumers have shown an interest in using smaller devices, for example, the use of tablets. One of the most important reasons that make individuals opt to use tablets over personal computers is its effectiveness in multitasking. The paper will discuss the advantages of the device from the perspective of hardware, software and demographics to analyze the replacement trend. The analysis explores the factors that will possibly influence the further preference of customers, suggesting that hardware's accessories, the development of cloud gaming technology may play a essential role in the later process. The demographic part shows tablet's using habits do vary from age to occupation, which turns out that the use of tablet is related with socio-demographic characteristics. Therefore, though tablet industry seems to be a promising industry, some efforts need to be made inevitably.*

KEYWORDS: Tablets, Hardware, Software, Demographics

1. Introduction

Research indicates that tablet accrues some advantages over personal computers. First, they have a note-taking software. The software is matched with a pencil making it easy and fast to take notes. For example, due to the ability of the iPad to combine handwriting, typing, and photos, it is becoming popular among young students aged 16 – 24 [4]. Secondly, for increasing game players, gadgets give them more diversified game choices. Also, the speed is faster. According to Lenovo, tablets use low performing processors that do not require much battery power compared to PCs [2]. Also, with advancement I technology, tablets can now support the same operating systems as those in full-fledged PCs. Tablets are also preferred due to their viewability capability, which means supporting full HD resolution. According to Gartner, the market for PCs has been declined in the past eight years. The decline is said to be at least 10% each year [1]. On the other hand, tablet sales had increased from 5% in 2010 to 40% in 2014. Research indicates that the introduction of the 5G network will make tablets market increase. However, since there will be no introduction of windows 11, the market for personal computers is predicted to decline [3].

This article will discuss the benefits of tablets and evaluate its replacement trend with computers, mainly focus on the hardware, software, and demographics aspects.

2. Methodology

To attain this objective, the treatment effect model will be used. Specifically, the selected sample population with a one-year tablet user experience will be classified according to their various purposes of using tablets, such as text editing, crowd classification, and gaming. At last, questionnaires will be issued to evaluate the experience of the participants and their preferences over personal computers.

2.1 Impacts of Personal Computers and Phones on Tablets

According to Gartner, the market for PCs has been declined in the past eight years. The decline is said to be at least 10% each year. The decline is attributed to the failure of the developers to adopt new households, as was the case years before the development of smartphones and tablets. On the other hand, the sale in smartphones has increased drastically since 2006. Statistics indicate that last year's shipments exceeded 1.5 billion. The increase in sales results from the emerging markets. Also, as per the research by Gartner, tablet sales had increased from

5% in 2010 to 40% in 2014. Research indicates that the introduction of the 5G network will make the smartphone and tablet market increase. However, since there will be no introduction of windows 11; rather, windows 10 will be upgraded periodically, the market for personal computers is predicted to decline.[3]

2.2 Hardware

Tablets production companies should consider how to innovate since they need to stimulate people's desire to buy their products. The completely new product which focuses on productivity is Huawei MatePadPro. It utilizes a hole-drilling design, pushing the screen ratio to 90%, and adopts a 2KQHO high-resolution screen, CDI-P3 film level color gamut which is the world's first tablet computer to reach this color gamut.[14] Such innovations are novel and competitive, leading to the rapid development of tablets. MatePadPro went into the market and shocked the whole tablet market by the adoption of complete innovations, challenged the traditional tablet. Therefore it suggests that innovation is indispensable to the development of tablets and consumers are more inclined to buy tablets that are creative, innovative and attractive in their functions, conformation, and appearance, according to the growth rate of innovative MatePadPro and the comparison between iPad. Reformation of the hardware industry will generate innovation. For example, the price of internal storage dropped sharply, leading to original equipment manufacturer (OEM) reduced semiconductor spending in 2019. The top five in the ranking of companies by semiconductor design are Apple, Samsung Electronics, Huawei, Dell and Lenovo and all of them have reduced chip spending in 2019.[15] As the cost of internal storage has declined, tablets companies have more opportunities and willingness to produce new products with larger internal storage to fit with consumers' needs. PC computers, mobile phones or other devices also have impact on tablets. Gartner predicts that 7% of providers in global communications service will have 5G services and by 2023, 5G phones will represent 51% of total phone sales. and trigger the market. After the popularization of 5G services, the mobile phone trend will not continue to decline since the current mobile phone market is 10% below the shipments in 2015 which is 1.9 billion. Besides, Worldwide PC shipments totaled 63 million units in 2019 but it is still declined 1% from 2018. The decline of traditional PC's market can be a great opportunity for tablets to expand.[5]

2.3 Software

As an intermediate form of PCs and smartphones, when it comes to usage, the status of tablets may be a little embarrassing. To argue if tablets still remain its competitiveness, the software industry cannot be neglected. It is said that the total download amounts of applications are 204 billion in 2019, it has increased 45% since 2016 [7].

In what software perspective displays, tablet companies should think of the advantages of tablets, and the suggestion is to create a special scenario for its tablet. The three main scenarios could be gaming, entertainment which includes video, social medias, searching engine, and office-oriented software. By doing so, it not only benefits marketing, but also incentive for customers to understand what tablet actually is.

Basically, the three main scenarios for tablets to consider are gaming, entertainment and office-oriented software.

With the appearance of matched pencil, there are many software developers dedicated to developing note-taking, painting, studying software. In a research, it is said that 55% of respondents would choose tablets for reading [8]. Even more users abandon Kindle and choose tablets, given that tablets' light is more comfortable for eyes [9]. From Figure 1 below, we can probably assume the main purpose of purchasing tablets is for using these applications, especially for those are not available in PCs.
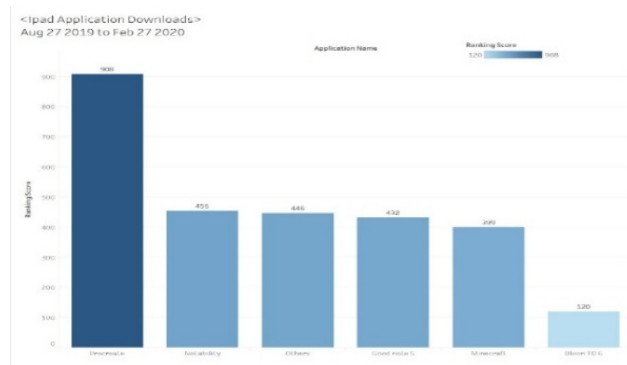
Fig.1 Ipad Application Downloads

"Global Shopping app downloads grew from 2018 to 2019 to over 5.4 billion, an indication of strong demand." [10] For social media, a mature industry, keeps updating, eventually touches 9.5 billion in 2019, increasing as 2 times as 2016 [11]. It is said that, tablets have become the preferred device for owners to watch online videos, with usage ratio, viewing frequency and viewing time far ahead of smartphones and PCs, tablets have profoundly even changed users' habits of watching online video [12]. Moreover, according to iResearch, tablet videos patch advertising CPM higher than PCs, and it owns capabilities like better advertisement experience by taking advantages of its larger screen [13]. Also, combined with the users' high-convert rate nature of advertisement, the global video companies may prefer to invest its marketing expenditure in tablet industry [14].

Undoubtably, gaming is always one of the core pillars of tablets and the mobile gaming's prosperity overruns the PC gaming's. According to Lifftof, the total new download number of game application is 56.5 billion in the past years, the growth rate decreases by 1.7% (see Figure 2). Fortunately, according to iResearch, the Cloud Gaming and 5G will tremendously decrease the requirement of hardware, which means the users no longer need to buy the most top-level configuration computers, some portable tablets will be more prevail, like tablets.

In this perspective, tablets may replace phone and PC in game industry by taking advantage of its portability and its larger screen. But the complexity of the PC and console cannot be supplanted with, what tablet should do is not only update the screen and graphics card, but also needs to cooperate with gaming companies. For example, iResearch says, switch, in addition to the innovative design of the switch console itself, the legend of zelda, Mario and Pokemon, the most famous IP games in the gaming world, are also important factors in the success of the switch [17]. Thus, if tablets want to take share of core gaming, it is not easy without help of cloud gaming and 5G technology.
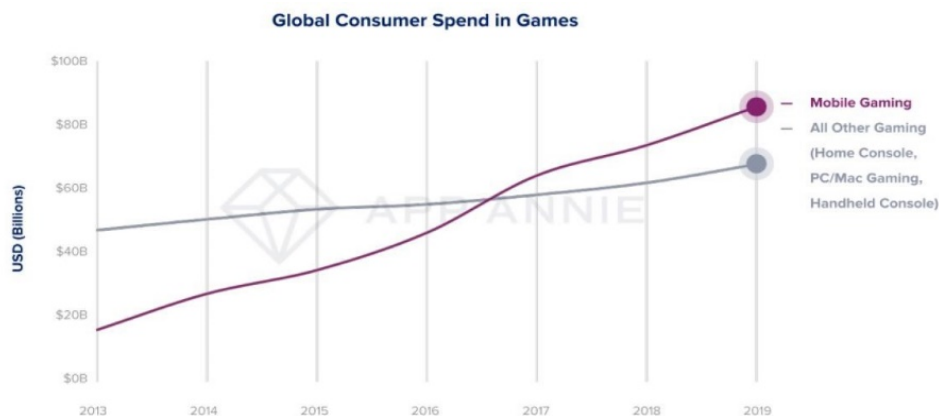
Source: App Annie, State of Mobile, December 2020.

Fig.2 Global Consumer Spend in Games

According to App Annie, core games represented only 18% downloads, yet 55% of time spent in top games [15], which represents that people may prefer more operational games. According to ESA, 52% of game players use PC to play games, while 60% of them use smartphones and about 49% use tablets or consoles [16]. Therefore, it is essential to convert the PC and the console users. Fortunately, the Cloud Gaming and 5G will tremendously decrease the requirement of hardware, which means users no longer need to buy the most top-level configuration computers, portable tablets will be more prevail [17].

2.4 Demographics

2.4.1 An Overview of Time Spent on Digital Devices

According to the Q3 2018 edition of the Nielsen Total Audience Report [18], taking the US population as an example, an overview of time spent on digital devices are shown as Figure 3.
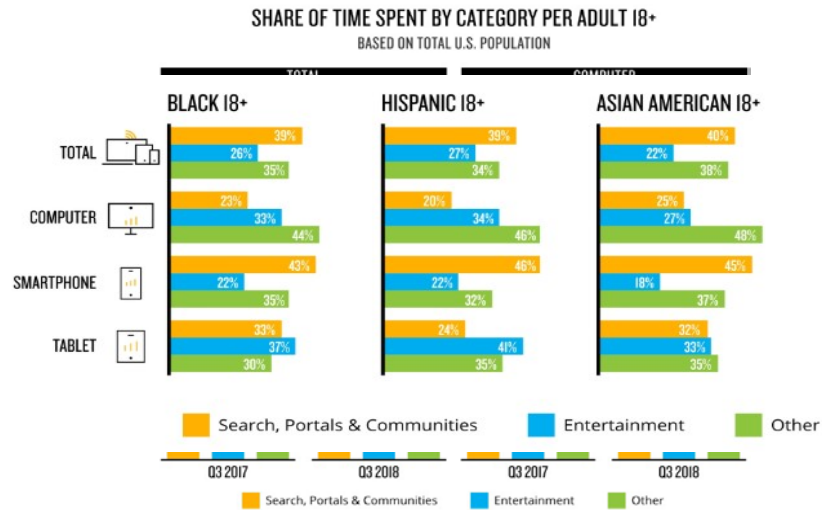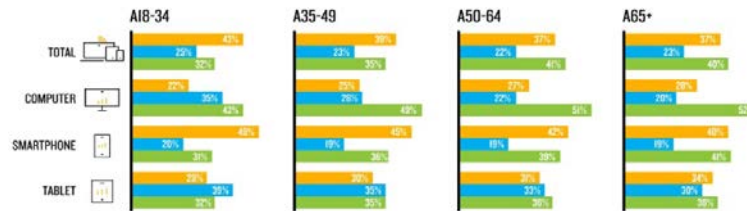
Source: Q3 2018 edition of the Nielsen Total Audience Report

Fig.3 Share of Time Spent by Category PER Adult 18+

2.4.2 Share of Time Spent by Category of Age

Besides, from Figure 4 below, it is apparent that with age growing, time spent on search, portals & communities and entertainment decreases. And when it comes to tablets, people aged 18 to 34 have the highest ratio of time spent on entertainment.
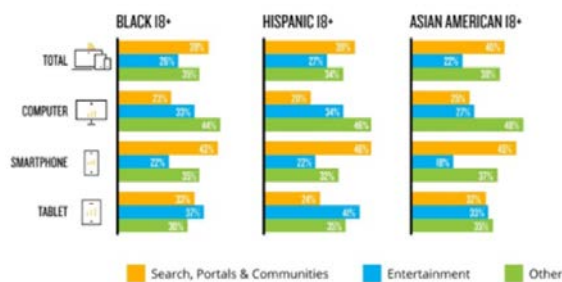

Source: Q3 2018 edition of the Nielsen Total Audience Report

Fig.4 Share of Time Spent Classified by Age

2.4.3 Share of Time Spent by Category of Ethnicity

Figure 5 below indicates that time spent among four devices is consistent across different races of adults in the US. And Hispanics spend 41% of their time on entertainment, which is greater than any other ethnicity groups. Also, the Black spend more time on search, portals & communities at 33%, more than other groups.

Source: Q3 2018 edition of the Nielsen Total Audience Report

Fig.5 Share of Time Spent by Category of Ethnicity

2.4.4 Device Ownership in Tv Households

As Table 1 below, there is 1% increase in tablet ownership while computer ownership remained unchanged in US TV households.

DEVICE OWNERSHIP % IN TV HOUSEHOLDS

	TOTAL		BLACK		HISPANIC		ASIAN AMERICAN	
	SEP 2017	SEP 2018	SEP 2017	SEP 2018	SEP 2017	SEP 2018	SEP 2017	SEP 2018
DVD/Blu-ray Player	70%	65%	65%	58%	62%	56%	56%	52%
DVR	55%	55%	53%	54%	48%	50%	48%	47%
Enabled Smart TV	32%	41%	29%	38%	38%	49%	46%	52%
Internet Connected Device	35%	39%	36%	40%	38%	40%	54%	57%
Game Console	42%	42%	42%	43%	52%	52%	45%	47%
Computer	79%	79%	68%	68%	70%	70%	91%	88%
Smartphone	88%	90%	90%	92%	95%	95%	96%	96%
Tablet	63%	64%	57%	57%	62%	62%	75%	75%

Table 1 Device Ownership % in Tv Households

Source: Q3 2018 edition of the Nielsen Total Audience Report

2.4.5 The Ownership and Use of Tablet Devices by Students

It is common sense that students are becoming a large consumer group of tablet devices.

According to the survey done by the University of Technology Sydney [19], there were 200 completed surveys in total. And 62% of those 200 university students (124 students) owned a tablet device at the time.

	Percentage of students	Number of students
None at all	15.32%	19
A little	18.55%	23
Some	28.23%	35
A lot	24.19%	30
Solely for studies	13.71%	17

Table 2 Influence of Studies in Student Tablet Purchase

Source: Tablets@university: The ownership and use of tablet devices by students. Australasian Journal of Educational Technology, 32(3), 50-64.

According to Table 2 above, the majority of students believed that it was a factor in their decision to purchase a tablet, and 13.71% of the students reported that they purchase a tablet for studies alone.
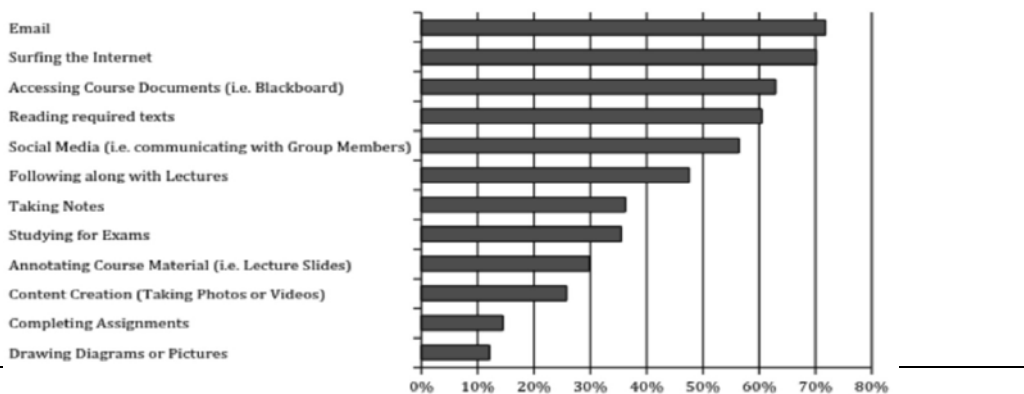
Fig.6 Students' Use of Tablets for Studies

Source: Tablets@university: The ownership and use of tablet devices by students. Australasian Journal of Educational Technology, 32(3), 50-64.

According to Figure 6 above, when students use the tablet for studies, the most popular usage was for Email at the ratio of 71.77%. And more than half of these tablet owners use it for surfing the Internet, accessing course documents, reading required texts and social media.

As a result, it can be seen that among 62% of students who owned a tablet, the majority reported that they purchased a tablet mainly for studies.

3. Conclusions

The use of tablets has become increasingly popular among young students, resulting in a decrease in the market for personal computers. Researches show that while the sale of a personal computer has decreased in the past eight years, tablets show consistent progress. This article highlights the benefits of mobile technology and evaluates how it has successfully replaced computers by analyzing on the tablet's hardware, software, and demographic aspects. Most tablet production companies do not show significant progress in terms of the products' hardware and software. Consequently, innovation is needed to stimulate costumers' desire to purchase their products. Tablets are mostly used for entertainment, gaming, and, work or study. The demographic that is most attracted to tablets are people aged 18 to 34 have the highest ratio of time spent on entertainment.

The treatment effect model will be applied in which tablet users with one year experience are selected as the sample for the questionnaire. From 200 questionnaires being distributed to university students, only 124 (62%) of them are valid. The results show that the majority of the respondents (35 students) sometimes use tablets and 24.19% identified themselves as heavy users of tablets, but only 13.71% use tablets solely for their study. The questionnaires also revealed that the top three activities that these students perform on their tablets are checking email, surfing the internet, and accessing Course Documents. Thus, even though tablet companies may need to improve the products with innovations to keep the healthy growth of their market share, many young students opt for tablets as their preferred gadgets. Tablet's hardware is not more sophisticated than personal computers, however, its size, weight, compactness, and mobility have attracted young users.

References

[1] Gartner (2020). 4 charts that explain the decline of the PC. [online] World Economic Forum.
[2] Lenovo (2020). Laptops vs. Tablets | Pros & Cons, Differences & Uses | Lenovo US. [online] Lenovo.com.
[3] Leprince-Ringuet (2020). Windows 10 upgrade rush got us buying PCs again - but not for very long | ZDNet. [online] ZDNet.
[4] Statista (2020). Tablet gaming by age UK 2012-2018 | Statista. [online] Statista.
[5] Green, D., Naidoo, E., Olminkhof, C., Dyson, L.E (2016). Tablets@university: The ownership and use of tablet devices by students. Australasian Journal of Educational Technology, vol.32, no.3, pp.50-64.